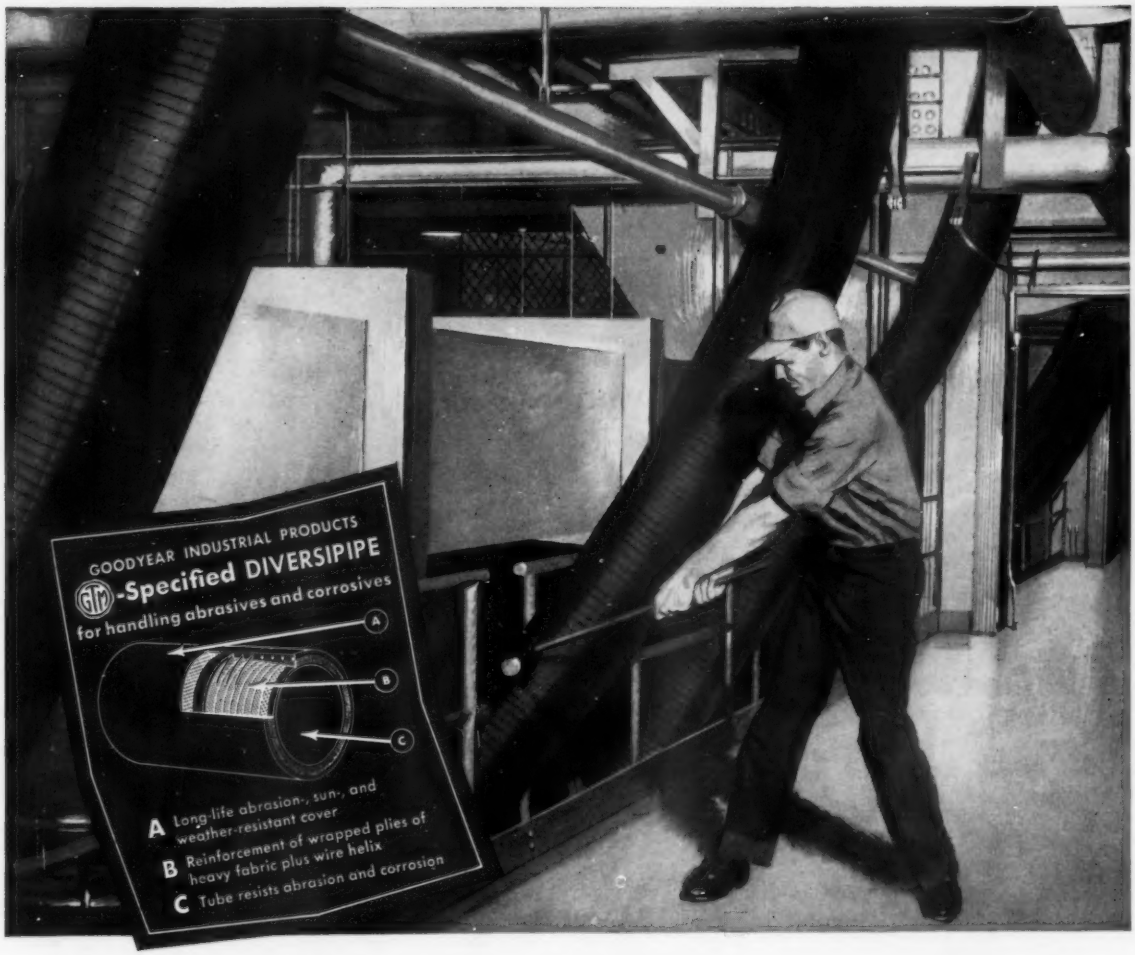
GOODYEAR INDUSTRIAL PRODUCTS
GT -Specified DIVERSIPIPE
for handling abrasives and corrosives
A
B
C
A Long-life abrasion-, sun-, and weather-resistant cover
B Reinforcement of wrapped plies of heavy fabric plus wire helix
C Tube resists abrasion and corrosion

These Rubber Firemen Outwork Iron 3 to 1

WEARING problem at a large Eastern power plant was the cast iron pipe through which hundreds of tons of coal daily dropped from roof-top hoppers to pulverizers. The surprisingly abrasive coal chewed through the heavy pipe in a few short months. Added trouble came from frozen coal which sometimes clogged the lines.

Seeking an answer to the frequent, slow, costly replacement of pipe, engineers turned to the G.T.M.—Goodyear Technical Man—who specified DIVERSIPIPE—rugged, hand-built, *rubber* pipe. These flexible, steel-muscled "rubber firemen" greatly simplify installation, permit rapid rotation to distribute wear, even absorb sledge-hammer beatings to loosen clogged coal and serve *over three times as long* as the iron pipe.

Handling problems you may have is a specialty of the G.T.M. He can quickly show you how dry materials, or practically anything pumpable, can be better moved at lower cost with one of the over 800 types of hose he has in actual production or the many more under development. Consult him through your Goodyear Distributor or write Goodyear, Industrial Products Division, Akron 16, Ohio.

YOUR GOODYEAR DISTRIBUTOR *can quickly supply you with Hose, Flat Belts, V-Belts, Packing or Rolls. Look for him in the yellow pages of your Telephone Directory under "Rubber Products" or "Rubber Goods."*

DIVERSIPIPE by

GOODYEAR

THE GREATEST NAME IN RUBBER

For more facts circle 502 on Reply Card

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'ROUND ABOUT with the editors in field and office

Edited by R. L. Marinello

Editor Attends Boston Outing

ANNUAL OUTING of the Boston Plant Engineers' Club was held on June 21, 1956 at the United Shoe Machinery Corp. Country Club. Among the 87 people present at this event, there was a number of guests, including E. B. Skubik, Associate Editor of PLANT ENGINEERING.

Activities started early in the afternoon offering those present opportunities to dig up a few divots. Lawn bowling attracted a goodly number of enthusiasts. Late in the afternoon there was a social hour which was highlighted by the repeated sampling of a gourmet's delight known as lobster tomalley, prepared by club members.

The outgoing president, Daniel J. Shea made some after dinner comments which included remarks touching on the heart fund. It is a praiseworthy custom of the Boston group to raise money at this outing not only for the heart fund but also for cancer-stricken children. The latter share in what is known as the Jimmy fund.

Last but not least on the program of the evening was the distribution of prizes to members and guests. Each person attending the outing receives one or more items from the central pool. The collection of gifts in this pool consists of items that each member contributes in his behalf and that of his guest or guests.

Check-List for Engineers

CHECK-LIST OF employment practices for the guidance of professional engineers and their employers is available to engineers, industrial executives, and engineering schools from the National Society of Professional Engineers.

The booklet's 16 pages of principles and questions suggest the responsibilities of the employer to his professional employees and the latter's responsibilities to the employer. Topics included in the criteria are recruitment, indoctrination, technical, administrative, personality and professional development of the individual, salaries, engineering titles, personnel practices and termination policies.

In format, the criteria consists of a listing of principles for each of the major categories of engineering career development. A check-list of questions follows the principles. The questions are designed to give the employer, the supervisor, the personnel administrator, and others, as well as the engineer himself, an opportunity to evaluate company and individual practices in relation to the principles listed.

Readers wishing a copy of this booklet should address their inquiry to Kenneth E. Trombley, National Society of Professional Engineers, 2029 K Street, N.W., Washington 6, D. C.

Plant Engineer Changes

Fred Trubshaw, recently retired from his position as chief plant engineer at the Robert A. Johnston Co., Milwaukee, Wisconsin.

Warren Lancaster, presently assistant plant engineer and associated with the company since 1946, will succeed Mr. Trubshaw.

Mr. Trubshaw, active in the engineering field since 1906, is a past president of the Engineering Society of Milwaukee and a member of the Wisconsin Society of Professional Engineers.

F. Trubshaw

W. Lancaster

Mr. Lancaster, a Registered Professional Engineer in Wisconsin, is an officer in the Plant Engineers' Society of Milwaukee, a chapter of the American Institute of Plant Engineers. He received his Mechanical Engineering degree in 1943 from Montana State College.

Reprint Says More Than We Did

IN THEIR July 1956 issue, the *Industrial Improvement* magazine reprinted the article "Conveyor Tows on Two Levels," prepared by Ray Mansfield, Materials Handling Engineer, Zenith Radio Corp., Chicago, Illinois. This article originally appeared in the March, 1956 issue of PLANT ENGINEERING.

We would like to point out that the reprint included an additional paragraph at the end of the article—which was not a part of the original article—discussing the merits of a manufacturer's equipment.

The editor of *Industrial Improvement* has promised to print a correction in the next issue. However, we did want

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Ideal for corrosive, high temperature and hazardous fume removal from:

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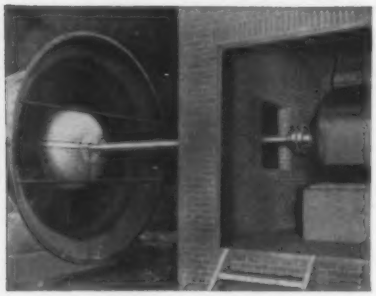
Eliminate Intermediate Bearings!



By using Thomas Flexible Couplings on long, unsupported shafts, intermediate bearings are eliminated. Thomas engineers tubular shafts free from lateral whip.

The large fan shown above is 16′ from the motor to allow sufficient air intake. Miners working underground receive their fresh air supply from this fan and others like it, which have been giving dependable service for as long as fifteen years . . . without shutdowns for lubrication or maintenance of the couplings.

Thomas floating shaft flexible couplings are recommended for machine and marine drives, printing presses, paper and cement mills, cooling towers, diesel engines, pumps, compressors, and many other uses.

Only Thomas Flexible Couplings offer *all* these advantages

UNDER LOAD and MISALIGNMENT

1. Freedom from Backlash—Torsional Rigidity
2. Free End Float
3. Smooth Continuous Drive with Constant Rotational Velocity
4. Visual Inspection in Operation
5. Original Balance for Life . . . *and*

Thomas All Metal Couplings have No Wearing Parts so Lubrication and Maintenance are Eliminated

Write for Engineering Catalog 51A

THOMAS FLEXIBLE COUPLING CO.

WARREN, PENNSYLVANIA, U.S.A.

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'ROUND ABOUT

to call this to the attention of our readers and to reemphasize the fact that PLANT ENGINEERING makes no editorial endorsement of any manufacturer's product—no matter how excellent the product may be.

From PE to Plant Manager

Gilbert N. Peterson, plant engineer at the Universal, Pa., plant of Universal Atlas Cement Co., has been appointed assistant plant manager at the Buffington, Indiana, plant.

A native of Stevens Point, Wisconsin, he attended the University of Wisconsin where he was graduated in 1949 with a B.S. degree in Mechanical Engineering.

He began his employment with Universal Atlas in 1950 as mill practice engineer at the Buffington plant. In 1951, he was made maintenance engineer at Buffington and in June, 1952, he was promoted to plant engineer at the Universal plant, which position he has held until his present appointment.

MH Training Films

FIFTY MATERIAL handling educational and training films are available from members of The Material Handling Institute, Inc.

The films cover all phases of material handling and are grouped according to 10 major categories: Batteries and Battery Care; Cranes; Fork Lift Trucks; Hand Lift Trucks; Truck Attachments; Material Handling in Specific Industries; Material Handling Fundamentals; Mechanical Handling of Specific Products; Safety; and Steel Strapping Applications.

These films are listed in the new catalog which is available on request. Included in the catalog is a descriptive resume of each film together with its running time and "where to send" information.

This catalog may be obtained by writing to The Material Handling Institute, Inc., Suite 759, One Gateway Center, Pittsburgh 22, Pa.

Preventing Windstorm Damage

NATIONAL BOARD of Fire Underwriters has just issued a new 40-page technical publication on how to prevent windstorm damage and help save lives and property. Information on tornadoes, hurricanes and other severe storms is presented, as well as the frequency of these storms, their occurrence and characteristics, and their effects on buildings.

The booklet "Windstorm Damage Prevention" points out that windstorm losses occur in a variety of ways, ranging in extent from damaging paint by windblown debris to complete collapse of a structure. But by attention to details of design and construction, when erecting new buildings or making repairs to old ones, much can be done to reduce losses from hurricanes and even tornadoes.

Suggestions are also made for municipal officials to guide their planning for storm emergencies. These include recommendations for pre-disaster planning, for safeguarding water supplies and for fire prevention and control.

The booklet also details steps which should be taken on the approach of a severe windstorm to reduce the chance of accidental injury or death.

A copy of this booklet may be obtained by writing to the National Board of Fire Underwriters, 85 John Street, New York 38, N. Y.

Plant Engineer to President

M. C. Patterson was recently elevated to president of the Dodge Division of Chrysler Corp. after serving as vice president in charge of manufacturing operations. He succeeds W. C. Newberg, who has been appointed Group Vice President-Automotive.

He began his automotive career as a die sinker machinist for Dodge shortly after his arrival from Scotland in 1921. Later he was transferred to the layout and machine drafting department, where he remained until 1925 when he was assigned to plant engineering.

In 1930, he became assistant plant engineer of the Dodge Main Plant and in 1938 was named plant engineer. He held this post for 10 years, becoming general works manager in 1948. In February 1955, he was named vice president with responsibility for all manufacturing operations.

Revised Standard on Fire Extinguishers

FOR THE first time since 1921 a new extinguisher classification scheme has been prepared and published by the National Fire Protection Association. This information appears in the new standard on the Installation and Maintenance of First Aid Fire Appliances.

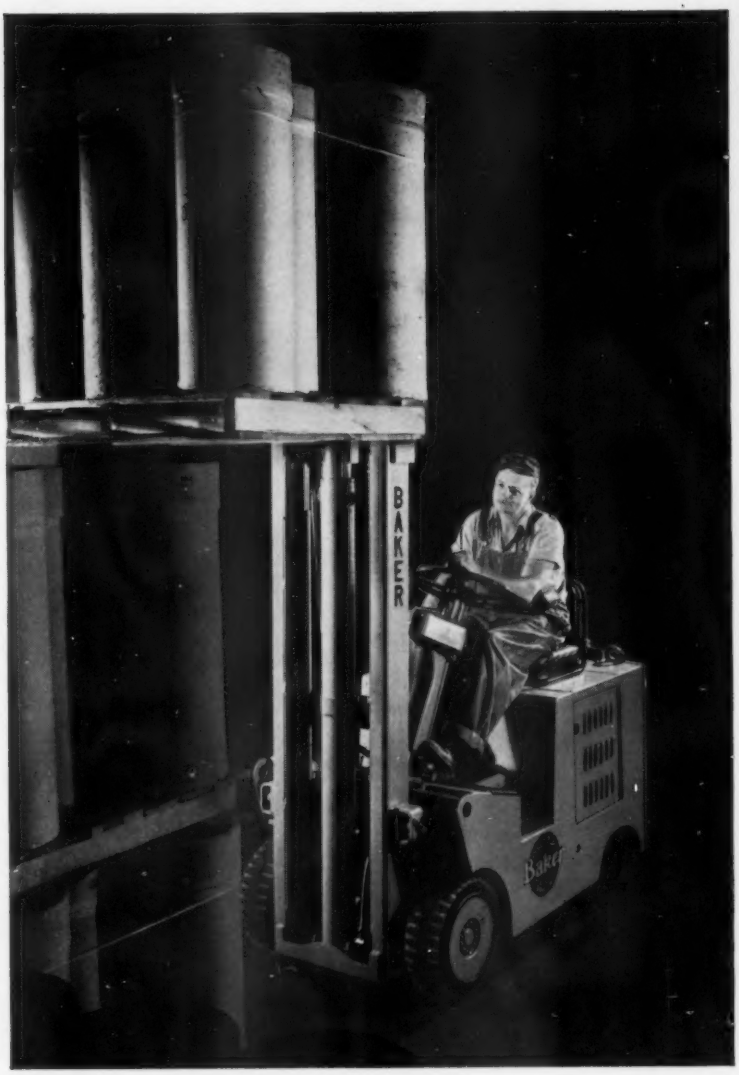
The new classification indicates the relative extinguishing capacity of different kinds of extinguishers on ordinary and flammable liquid fires. It emphasizes the fact that not all fires are alike and an extinguisher suitable for one type of fire will not be effective on another.

The standard also gives detailed suggestions for the operation and maintenance of soda-acid, water, foam, vaporizing liquid, carbon dioxide, dry chemical and wetting agent extinguishers.

It is available in pamphlet form from the National Fire Protection Association, 60 Batterymarch St., Boston, Massachusetts, at 50 cents per copy.

the gas truck that does more work because it spends more time on the job!

BAKER "FG"



here's why...

Every step in the design of the new Baker "FG" gas fork truck was aimed at this end result: Maximum dependable and efficient performance, and longest life. The power plant, for example, is a heavy-duty gas engine designed expressly for rugged industrial truck service, power rated to truck capacity and geared to operate at optimum RPM. Compact rigid power train without troublesome universal joints... split clutch housing for better accessibility... single oil supply for entire assembly... full-floating, self-energizing, self-equalizing hydraulic brakes with one-point adjustment... these are a few of the features that mean *more time on the job.*

Our confidence in the "FG" is backed by a full 6-months' warranty—the only gas truck offering this protection. Capacities up to and including 7000 pounds. Write for specific bulletins.

Baker®
handling equipment

THE BAKER-RAULANG COMPANY
1251 WEST 80th STREET • CLEVELAND 2, OHIO

A Subsidiary of Otis Elevator Company

6G-1

For more facts circle 505 on Reply Card

"What would you say if your boss asked . . .

'Are we ready for automation?'"

"Two years ago I didn't know the answer when the boss asked me, 'Are we ready for automation . . . electrically?'

"As plant electrical services engineer I had to come up with the answer . . . and it was a real surprise. Much of our electric equipment was antiquated and took up a lot of valuable production space. The power supply wasn't as safe, dependable or flexible as we wanted it . . . maintenance costs were soaring.

"We had spent so much time improving manufacturing processes and methods that we had neglected electrical needs. Result . . . we weren't even up to date, let alone prepared for automation.

"Steps were taken immediately to make sure our plant was adequate electrically. Today it has more automatic equipment and work-handling devices, and is equipped for more advanced types of automation. Electrical adequacy is being designed into our new branch plant, too.

"There's no reason why you can't do the same to make your plant more efficient."

J-96100-1

Industry has electrical adequacy problems . . .

Surveys show that many of the nation's plants are inadequate electrically. A recent study of 42 plants in a given area revealed 88% had electrical problems that interfered with production.

These Problems Can't Wait

	Percent of Plants Inadequate — Electrically*
Inadequate transformer capacity and flexibility	42%
Questionable breaker interrupting capacity	63%
Lack of power centers	62%
Poor power factor	25%
No motor control centers	42%
No plug-in bus duct	32%
Low primary distribution voltage (below 4160 volts)	49%
Low secondary voltage (below 480 volts)	25%
Lack of network distribution systems	90%
Lack of automatic switching to maintain continuity	69%
Absence of 277-volt lighting	94%

*Based on report of survey in 156 top U.S. plants conducted by *Factory* magazine.

WATCH WESTINGHOUSE!

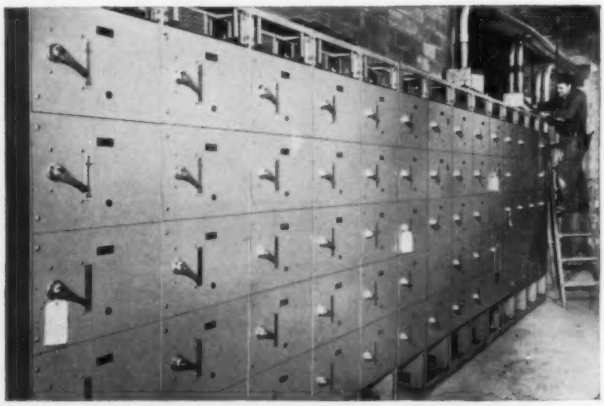
COVER THE PRESIDENTIAL CAMPAIGN ON CBS TV AND RADIO!

"I called in Westinghouse...

We got dependable, flexible power supply for greater productivity"

Westinghouse switchgear is available in 10 basic units with a selection of standard instrument panels . . . future additions or replacements can be made easily and quickly any time.

Westinghouse dry-type transformers save space, mount conveniently in out-of-the-way places. Well suited for wet, dirty or hot locations. Placement close to work load saves long, costly secondary runs.



Expansion with Westinghouse control centers frequently saves as much as 40% on installation costs over decentralized methods of mounting motor control. Inspection and service are simplified.

"When I found what some of our troubles were, I called in some expert help from Westinghouse. Working with our staff and our consulting engineers, Westinghouse further studied the condition of our plant power distribution system . . . its construction, age and state of repair.

Switchgear improved safety, operating continuity

"We installed Westinghouse low-voltage, metal-enclosed switchgear which had high interrupting capacity for safety and operating continuity. This reduced our maintenance, brought economic advantages and freedom to expand our facilities.

"Unitized switchgear reduced special design and engineering expense for our new installation, and also provided custom-built preciseness in meeting our application requirements.

Capacitors paid for themselves in 18 months

"Capacitors were carefully applied with Westinghouse help at the substation bus, on secondary bus duct, and right at the motor loads. In the first year, savings on our power bill amounted to 75% of capacitor installed cost. Capacitors paid for themselves in 18 months, and savings are still being realized.

"The capacitors reduced the burden on our feeders and released electrical capacity for other needs. We got better voltage regulation at our motor and lighting loads.

Transformers gave us power . . . where we wanted it

"Placing Westinghouse transformers strategically throughout our plant gave us power close to the load . . . conveniently, economically. Oil- and askarel-filled units were used where we needed high-impulse levels, while dry types were used when light weight, and ease of installation were key factors.

System flexibility with packaged control

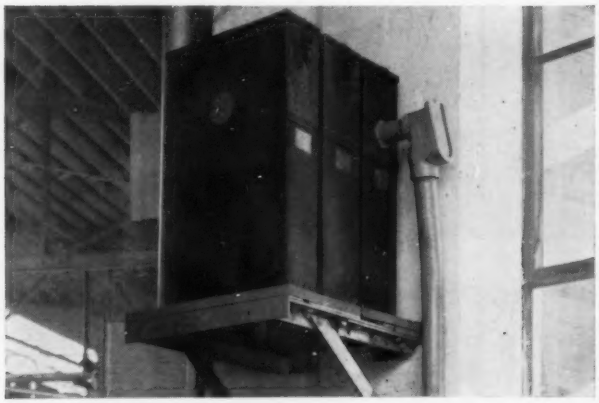
"Some of our machines were subject to frequent moving, so we used Westinghouse plug-in bus duct with individual controls at each machine. For our permanent arrangements, we used control centers for simplicity in planning and installation, a high degree of safety and flexibility, centralized operation and maintenance. In both cases, we found that Westinghouse packaged control equipment simplified system design, cut our costs up to 40%.

"Why not call Westinghouse . . . like I did?"

"I'm sure you'll find Westinghouse a real lifesaver in helping out with your plant power distribution systems, too. Their engineering team will gladly work with your staff and your consulting engineers. I got our plant on the road to electrical adequacy by getting in touch with my local Westinghouse representative."

For more information call your local Westinghouse sales office or send coupon. Westinghouse Electric Corporation, 3 Gateway Center, P. O. Box 868, Pittsburgh 30, Pennsylvania.

J-96100-2



Westinghouse capacitors are low in initial cost, require no maintenance, save additional investment in transformer capacity. Solder-sealed porcelain bushings protect against leaks or contamination of dielectric.

WATCH WESTINGHOUSE!

COVER THE PRESIDENTIAL CAMPAIGN ON CBS TV AND RADIO!

Westinghouse Electric Corporation
3 Gateway Center, P. O. Box 868
Pittsburgh 30, Penna.

☐ I would like a showing of the 20-minute film, *Selecting the Right Industrial Distribution System.*

I'm interested in more information about:

☐ Switchgear ☐ Capacitors
☐ Transformers ☐ Controls

NAME_____ TITLE_____

FIRM_____

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CITY_____ STATE_____

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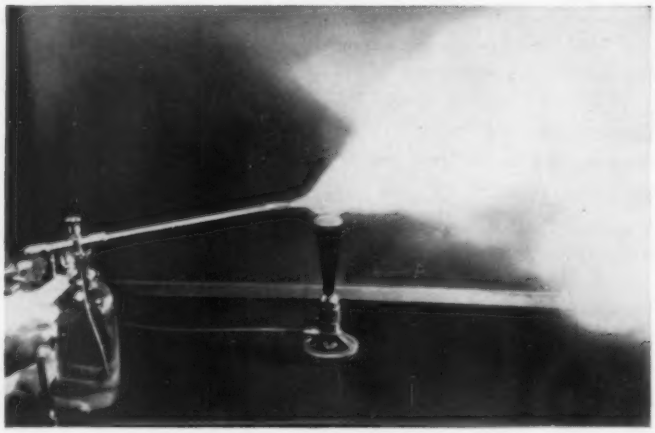
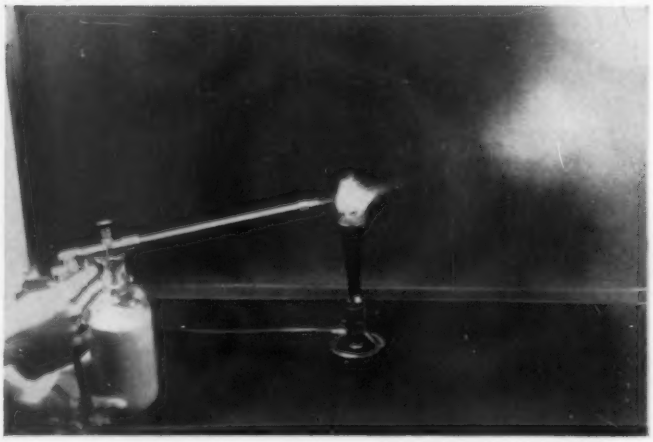
Announcing...the First

HYDRAULIC

Flame tests prove its fire-snuffing ability



This photo shows the instant combustion taking place when a conventional hydraulic oil of mineral oil type is atomized over a Bunsen burner.



In this photo, Shell Irus Fluid 902 replaces the mineral oil. Note that there is no ignition.

SHELL IRUS FLUID 902

Oil-Base fire-resistant FLUID

SHELL IRUS FLUID 902

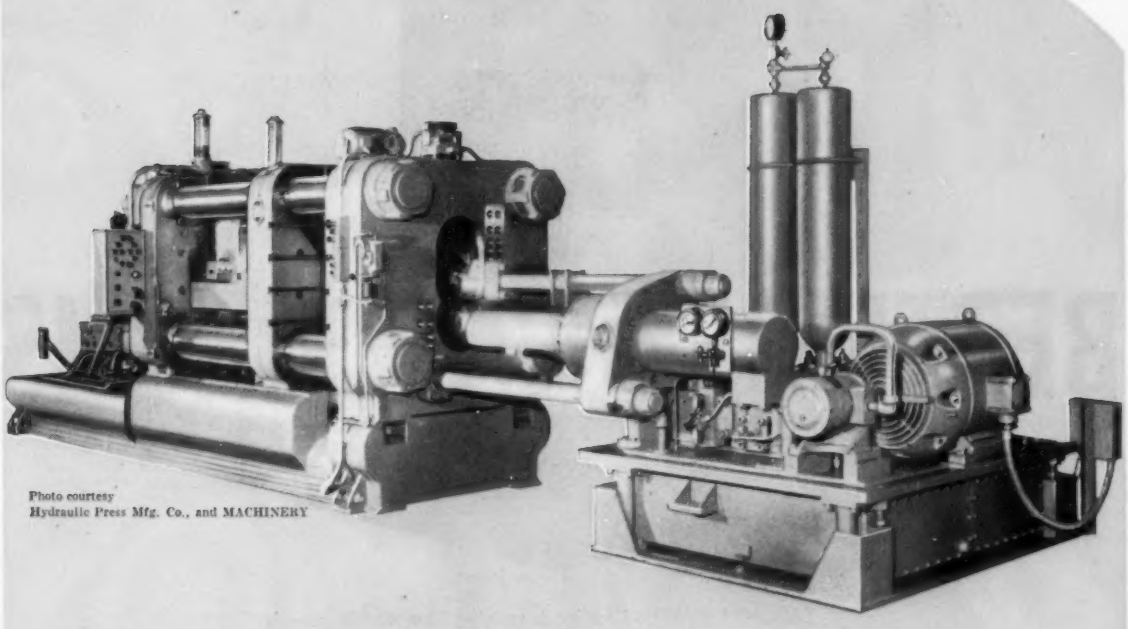


Photo courtesy
Hydraulic Press Mfg. Co., and MACHINERY

AFTER THREE YEARS of intensive research, field application and evaluation, Shell Irus Fluid 902 is now commercially available for use in industrial hydraulic systems. While its cost is far lower than other fire-resistant fluids, its performance is comparable.

No major modification of equipment is necessary. Shell Irus Fluid 902 is a special formulation containing no corrosive ingredients . . . no adverse effect on seals or fittings. It is a direct replacement for hydraulic oils now in service.

Noncorrosive, and nonrusting. Steel and copper panels immersed in Irus Fluid 902 for one week at 160°F have shown no significant signs of corrosion. Rusting has not been a problem in long-continued field tests.

This is an efficient fire-snuffing hydraulic fluid that can be widely used. Send coupon for details.

SHELL OIL COMPANY

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SHELL

SHELL OIL COMPANY
50 West 50th St. or 100 Bush St.
New York 20, N. Y. San Francisco 6, Cal.

Please send me test data and information on Shell Irus Fluid 902.

Name_____

Company_____

Address_____

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FREIGHT ELEVATORS for loads ranging from 40,000 pounds down to 1,500 pounds.

Booklet B-705 describes Otis Heavy Duty Freight Elevators.

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Booklet A-414 describes Otis Plunger Electric Freight Elevators.

Booklet A-382 describes all Otis Vertical Transportation equipment and services.

ELECTRIC DUMBWAITERS for loads up to 500 pounds at speeds of 50 to 300 f.p.m.

Booklet A-411 describes Otis Traction Type Dumbwaiters for all-purpose use in multi-story buildings of any height; Otis Drum Type Dumbwaiters for 30'-6" maximum rise; and Otis Undercounter Dumbwaiters for stores and restaurants.

We'll be glad to send you any or all of the above booklets.

Otis

ELECTRIC • PLUNGER ELECTRIC

freight elevators

LIGHT, GENERAL, AND HEAVY DUTY

ELECTRIC DUMBWAITERS

OTIS ELEVATOR COMPANY • 260 ELEVENTH AVENUE • NEW YORK 1, N.Y.

No
installation
is too

small

THE BUSINESS OF OTIS

OFFICES IN 297 CITIES ACROSS THE UNITED STATES AND CANADA

For more facts circle 508 on Reply Card

"We had as many as 24 Solenoid coils a month burn up before we installed BUSS FUSTATS" . . .

"Now our burned up coil losses are negligible."

C. R. Babcock, CHIEF ELECTRICIAN
DEWEY PORTLAND CEMENT CO., DAVENPORT, IOWA

Mr. Babcock continues ——

"The burning up of the solenoid coils that activate the plungers that dump our weighing scales was a real problem with us. We lost as many as 4 coils on one 8 hr. shift. The maximum was about 24 coils a month.

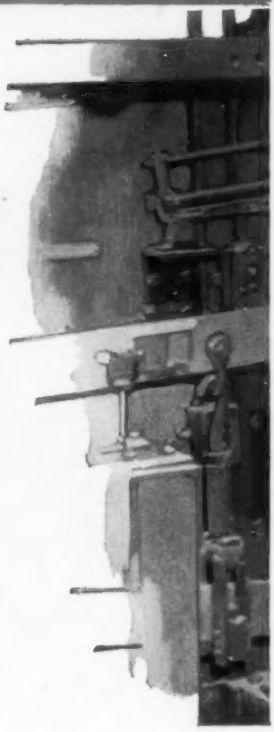
"Trouble develops on the days when the gypsum for our cement picks up moisture and sticks to the scales. Then the counterbalance can't reset the scale and, as a result, the plunger moves up and down energizing and de-energizing the thrust coil. The coil has only a few turns of large copper wire and draws a heavy current each time it is energized. It heats up quickly and burns up.

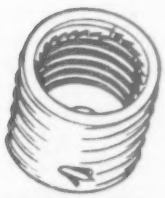
"To give over-load protection to the thrust coil, which is on a 125 volt DC power supply, we installed a 3.2 BUSS Fustat in a series with the coil. (BUSS Fustats are FUSETRON dual-element fuses with a type S base for use on circuits up to 125 volts.)

"Now, when there is trouble the Fustat opens before the coil is damaged. The scale is cleaned and another Fustat installed. We are then back in operation.

"We have three of these scales and at the present time we are replacing only about one coil a month and this is generally due to mechanical and moisture damage.

"We figure BUSS Fustats save us money in two ways — by practically eliminating the cost of replacing solenoid coils — and by greatly reducing our down-time losses."





On circuits of 125 volts or less —

The Proper Size BUSS Fustat can Reduce Danger of Burnout of Solenoids, Coils, Transformers and Motors

A BUSS Fustat is a Fusetron dual-element fuse with a type S base for use on circuits of 125 volts or less. A Fustat gives all the protection of a fuse against short-circuits or dangerous overloads — yet, it permits circuit to be loaded safely to maximum capacity.

Protecting Solenoids, Coils and Transformers —

By installing the proper size Fustat, a solenoid can be protected because the Fustat will not open on the operating surge but will open in time to protect, should the heavy current continue too long for any reason.

A transformer or coil, likewise, can be protected because the long time-lag of the Fustat permits it to hold all normal current surges and harmless overloads — yet it will open to prevent burnout on any dangerous overloads.

Protecting Motors against burnouts —

A BUSS Fustat of motor-running protection size mounted anywhere in the circuit to handle ONLY the motor current will give finest available protection against burnout of the motor.

Nothing else is needed. Underwriters' Laboratories listing gives Fustats same degree of approval for both motor-running and short-circuit protection as the most expensive devices made.

BUSS Fustats stop dangerous practice of tampering or overfuseing

The type S (tampering resisting) base of a Fustat prevents anyone replacing them with an ordinary fuse, a penny or other substitute — or with a size too large to protect.

Fustats fit ordinary Edison base fuse holders through use on an inexpensive adapter that once installed need never be replaced.

Write for bulletin SMPS.

On any circuit up to 600 volts — Use a FUSETRON dual-element Fuse.

Fusetron fuses protect motors, solenoids, coils and transformers against burnout; they offer maximum safety because of their 100,000 amp. interrupting rating; they help increase production by eliminating needless blows and they cut maintenance costs because they are maintenance free.

Write for bulletin FIS . . .

For loads above 600 and up to 5,000 amps. — Use BUSS Hi-Cap Fuses.

When coordinated with Fusetron fuses they will not open ahead of the fuse nearest fault . . .

Write for bulletin HCS.

Play Safe! **Install BUSS Fustats, FUSETRON Fuses and BUSS Hi-Cap Fuses throughout entire Electrical System!**

FUSETRON
TRUSTWORTHY NAMES IN ELECTRICAL PROTECTION
BUSS

Bussmann Mfg. Co. (*Division of McGraw Electric Co.*)
University at Jefferson, St. Louis 7, Mo.

For more facts circle 509 on Reply Card

LEON B. SENTER, A. I. A.
ARCHITECT
306-7 PHILTOWER BLDG.
TULSA, OKLAHOMA

November 28, 1955

Regarding our choice of RoZone-RoSeal cable for St. John's Hospital:

We can tell you that due to the nature of the building, extreme reliability was the first consideration.

Closely following were the requirements of moisture resistance, inductive capacity in the configuration as laid, and uniformity of product.

We found that a specification built around Rome Cable's RoZone-RoSeal satisfied all the above.

Very truly yours,

LEON B. SENTER, A.I.A.

John C. Penafeather
Mechanical Engineer

JCP:lz

Besides lower cost, RoSeal gives you superior physical characteristics such as easier pulling. St. John's Hospital, Tulsa, largest in Oklahoma, uses RoZone-RoSeal buried underground and in conduit inside hospital.

How an architect gets the quality high-voltage cable he wants at less cost

What is RoSeal?

It's a special flame-resistant polyethylene compound we developed as an over-all sheath for insulated cables.

What is RoSeal's cost feature?

RoSeal costs less than most conventional thermosetting nonmetallic sheaths—a fact that's reflected in the lower cost of the finished cable, such as RoZone-RoSeal.

How does RoSeal compare with thermosetting nonmetallic sheaths?

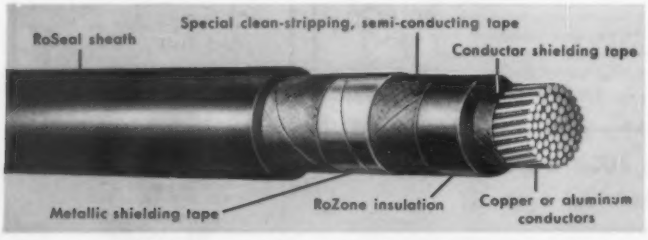
1. Greater moisture resistance.
2. Equivalent resistance to weathering and soil conditions.
3. Easier pulling and bending. Because of its waxy structure, RoSeal has a lower coefficient of friction than any other sheathing material. It bends easily at temperatures as low as −40°C.
4. Good resistance to abrasion, crushing, and impact.
5. Equal durability and life span.
6. High resistance to chemicals and oils.
7. Inherently high corona levels on power cables.

Where can you use RoSeal?

Anywhere—in the air, in conduit and ducts, direct in earth, even in water.

How can you find out more?

Simply write for Bulletin ROT-1.

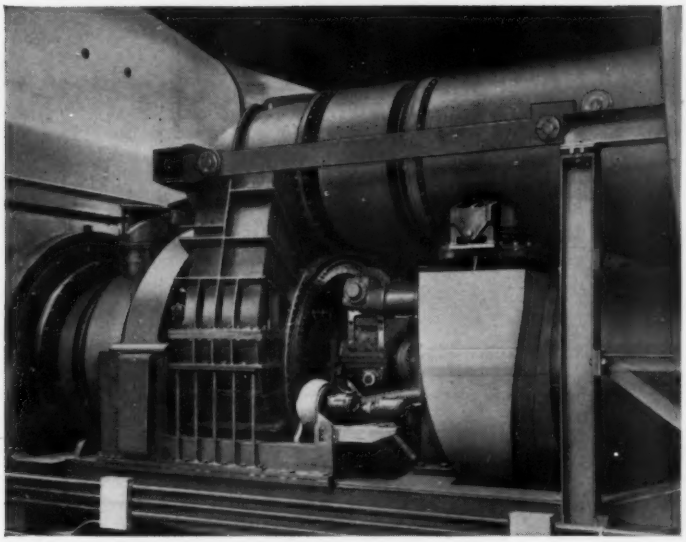


RoZone-RoSeal shielded power cable for high-voltage applications through 15 kv.

It Costs Less to Buy the Best

ROME CABLE Corporation
ROME · NEW YORK
and
TORRANCE · CALIFORNIA

For more facts circle 510 on Reply Card



Clark 8500 BHP Gas Turbine for centrifugal compressor, generator or pump drive.

GAS TURBINES + CENTRIFUGAL COMPRESSORS

Only CLARK builds both!

Now you can get centrifugal compressors and modern gas turbines to drive them *exclusively* from one manufacturer . . . Clark.

In addition to saving money and headaches, you'll get proved, matched-performance "packages" specifically designed for continuous trouble free service.

Whether you have a million or a billion cubic feet of air or gas per day to handle at pressures of up to 4500 pounds per square inch, there is a Clark centrifugal compressor and in most cases a matching Clark gas turbine to drive it.

Your nearest Clark representative will be pleased to give you all the facts.

CLARK BROS. CO., OLEAN, N. Y.

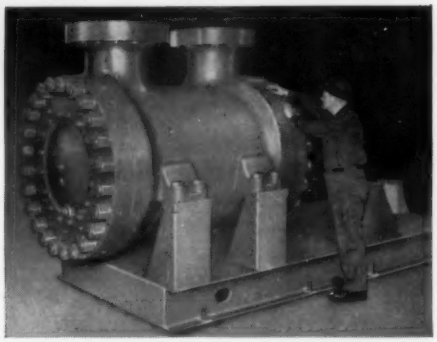
One of the Dresser Industries

Offices in Principal Cities throughout the World

CLARK®

GAS TURBINES
CENTRIFUGAL COMPRESSORS

Clark Barrel Type Centrifugal Compressors for extremely high pressures.



Clark Multi-Stage Centrifugal Compressors designed for process applications.

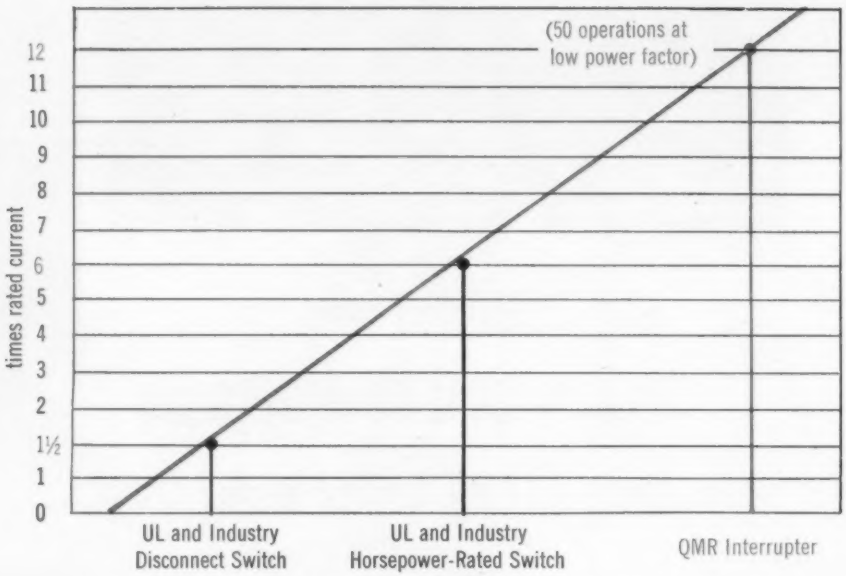
Clark Centrifugal Pipeline Booster for low ratios and high pressures.

For more facts circle 511 on Reply Card

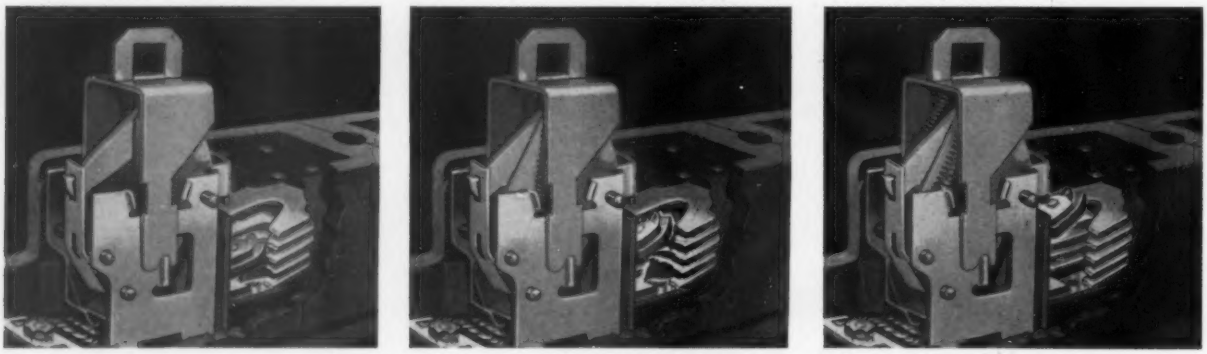
General Electric Announces

A new quick-make, quick-break

...with rated overload capacity 100% higher than industry standard!...with new margins of protection!... with heavy duty performance at a light duty price!

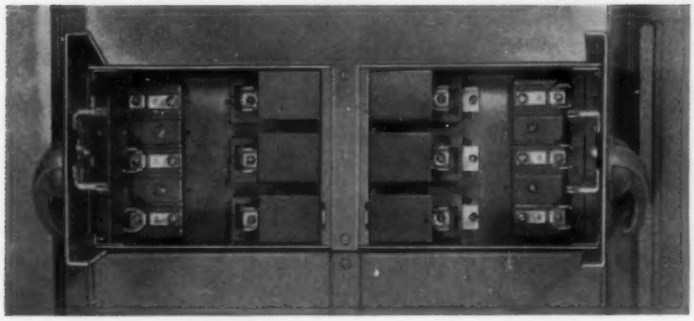


G.E.'s new Type QMR panelboard can interrupt power circuits formerly requiring larger, more expensive switches. Most fusible power panelboards are built to interrupt only six times the normal full load current of motors and other equipment to which the switch has been applied, meeting minimum UL and NEMA standards (see graph). The Type QMR interrupter has been tested and rated at *12 times* the normal full load current, giving a capacity 8 times the UL standard for a disconnect switch and twice the standard for a horsepower-rated switch. Hence, the economical Type QMR panelboard can be used on power circuits formerly requiring a larger, more expensive switch. Interrupter ratings of Type QMR are coordinated with fuse ratings to give new levels of protection to both equipment and personnel.



G.E.'s new arc chamber fences in the arc, breaks it into harmless segments—and snuffs it out. These drawings illustrate in sequence what actually happens during the instantaneous disconnect of the new Type QMR panelboard switching mechanism. The nickel-plated grids of the arc chute magnetically suck the arc away from the contacts, divide it, cool it, destroy it—all in one quiet micro-second. And since the action is spring controlled, the arc cannot be held by "teasing" the contacts. Pitting of contacts is thus minimized, temperature is kept low and safety margin extends far beyond rated interrupting capacity. *The three-fold result: longer switch life, greater equipment protection, greater personnel safety.*

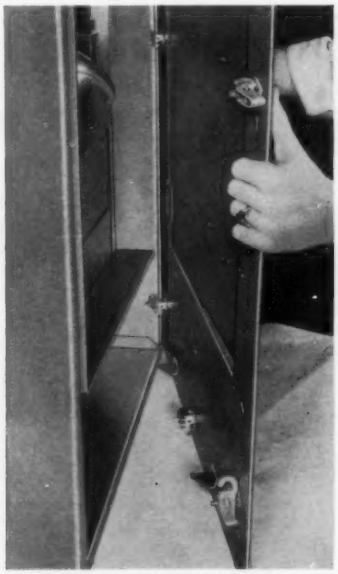
fusible power panelboard



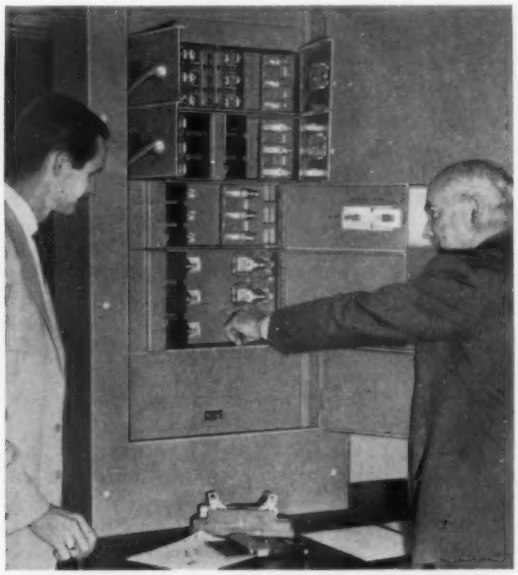
Increased protection and greater savings. Higher I.C. and horsepower ratings on low ampere G-E switches give you added protection on your equipment and save money at the same time. You get quick-make, quick-break switching plus the security of fuses—heavy-duty operation for the price of light-duty equipment. Fuses can be changed quickly because of obstruction-free compartments.

Extra safety features. Interlocked unit door cannot be opened when switch is in ON position. Switch unit door latch padlocks "closed" to prevent tampering, "open" to safeguard working electrician. New improved "swing-close" lock on panelboard door withstands rough handling and gives additional security.

Easy Operation. A woman's touch—even with just the pull of a thread—can easily disconnect the circuit. Also, *every* QMR switch unit is calibrated for exact, uniform contact pressure—*every* switch unit!



Quick, inexpensive installation. Solderless lugs, ample wiring gutters and removable box ends speed up installation. In fact, one man can do the wiring, put on the front and, with the rotating adjustable clamps, adjust it to compensate for any misalignment of the box mounting.



General Electric's full line of improved quick-make, quick-break switches are UL listed. They offer increased protection for a complete range of installation requirements . . . and with fillers and pre-drilled bus bars, the Type QMR panelboard allows for quick, inexpensive expansion in the future. For complete details on the new Type QMR panelboard, write *Distribution Assemblies Dept., General Electric Company, Plainville, Conn.*

Progress Is Our Most Important Product

GENERAL ELECTRIC

For more facts circle 512 on Reply Card

Insulation is snapped on 8" pipe

Staples are used to close seam

Texas City Chemical Company takes advantage of —

LOWER HEAT LOSSES, LOWER COST

with new G-B SNAP*ON Pipe Insulation

Company saves 32,000 Btu per hour, with ½" less wall thickness

Problem: Over 1700 feet of pipe that was to carry steam or molten sulfur at temperatures up to 300° F. had to be insulated at Texas City Chemical Company's new dicalcium phosphate and sulfuric acid plants at Texas City, Texas.

Solution: Company's chief engineer approved G-B Snap*On glass fiber insulation, when calculations showed less heat loss at a lower material cost than another widely-used insulation material.

The pipe insulation, composed of fine glass fibers bonded with phenolic resin, was supplied in standard one-piece sections six feet in length. It was spread apart at the seam and snapped-in-place on the pipe. Results: Besides material and heat savings, the insulation contractor (Precision Insulating Co.) reports that the applied costs were 20% less than the job estimate (based on time standards for other insulating materials).

At 300° F. mean temperature, the heat loss comparison was calculated for the job. (See table.) At this temperature, a savings of over 30,000 Btu per hour was found. This improved insulation performance resulted even with ½" less wall thickness.

As the insulation did not chip, break, or crumble, no tailings were left around installation area.

G-B Snap*On glass fiber pipe insulation is available in sizes that will fit pipe from ¾ inch to 33 inches nominal diameter, inclusive.

Write today for samples and full details or call G-B Snap*On distributors (in the Yellow Pages) who carry local stocks in 72 cities.

Heat Loss Comparison

Snap*On vs Competitive Insulation

Nominal pipe size	Length (ft)	Competitive insulation thickness	Btu/ft loss (300°F)	G-B Snap*On insulation thickness	Btu/ft loss (300°F)	Total Btu savings per hr
8"	444	2	120	1½	91	12,876
6	6	2	97	1½	76	126
4	300	2	73	1½	53	6000
3	582	1½	73	1	59	8148
2	432	1½	55	1	43	5184
	1764					32,304

GUSTIN-BACON *Manufacturing Company* gb

Thermal and acoustical glass fiber insulations • Pipe Couplings and fittings • Railroad gaskets and supplies

244 W. 10th St., Kansas City, Mo.

For more facts circle 513 on Reply Card

BULLETINS just released and of immediate plant interest

DUST CONTROL

101 **Centrifugal Dust Collector** — Twelve-pp Bulletin 100 introduces the Cyclo-trell multiple tube dust collector which operates on centrifugal collection principles and incorporates new features to boost collection efficiency and gas handling capacity. An illustrated explanation of operation and construction of this collector is accompanied by collection efficiency and capacity nomographs. Tables give design data for six sizes, from three to 20 tubes. Research-Cottrell, Inc.

102 **Unitized Dust Collection**—"You Can Solve That Dusty Cost Problem," 12 pp, describes principles of unitized dust collection, its advantages and savings. Illustrated with cartoons, cutaways and photos, booklet describes dust damage; includes general information on collectors and reductions in operational expenses afforded. Torit Mfg. Co.

103 **Dust Collector**—Bulletin 920B describes a dust collector designed for the wet collection of industrial dusts. Drawings and photos illustrate operation, and dimensions, weights and capacities are given. Pangborn Corp.

104 **Cupola Dust Control** — Dust Control Bulletin 292 describes the operation of company's dry-type centrifugal dust collector designed to handle large exhaust volumes of granular dust such as those found in foundry cupolas or boiler stacks. Explains how counterweighted caps are added to the cupola tops and cupola stack gases are pulled through damper section where initial flash cooling occurs. A diagrammatic drawing details operation features. American Air Filter Co., Inc.

PUMPS AND PUMPING

105 **Hydraulic Pumps**—Twelve-pp Service Manual S-1010 describes in detail disassembly and assembly procedures for maintenance and overhaul of Hydreco flange mounted pumps, foot mounted pumps, and foot mounted fluid motors. Cutaway view illustrating component parts is included, as well as a trouble shooting table, recommended wear tolerances, clearance chart, suggested test rack and test procedure and testing instructions, and parts list. Kalamazoo Div., The New York Air Brake Co.

106 **For Constant Displacement**—Bulletin 46000 discusses advantages of company's constant displacement radial piston pumps, and covers construction, operation, speeds, capacity and pressure ratings. Photos and dimensional diagrams are included. The Oilgear Co.

107 **Paint Pump** — Versatility of handling paint easily and efficiently without waste is one of the advantages of this paint pump described in 8-pp Form 1-3100. Applications in production finishing, maintenance painting and coating operations are discussed, construction features and typical hook-ups are illustrated, and specifications and capacities tabulated. The DeVilbiss Co.

108 **Chemical Process Pumps** — Bulletin B-1608, 12 pp, describes a concept of economy through interchangeability of components, a feature of company's Type DL and Type DM chemical process service pumps. Lists characteristics, tells how to order and assemble pumps on pump frames, and illustrates important design and construction features, with cutaway photos of component parts. Dimensions and performance data given. Peerless Pump Div., Food Machinery and Chemical Corp.

PIPING, VALVES, FITTINGS

109 **On Transite Pressure Pipe**—How to install company's Transite pressure pipe for overhead industrial water and process lines is told in this 48-pp pocket-size guide. Text is divided into 15 sections and covers such items as hanging and supporting the pipe, bracing for thrusts, poured flange coupling and Roto-Split flange coupling. Suppliers of fittings, accessories and couplings are also listed, and diagrams of typical transite systems for overhead lines are included. Johns-Manville.

110 **Jacketed Piping**—Catalog 356, 26 pp, discusses design and applications of jacketed piping systems designed for piping of high melting point products and viscous materials and for the cooling of materials as they are piped from one process to another. Piping layouts are included, as well as data on materials, fittings, plug valves, relief valves, pipe, flexible hose, expansion joints and basket strainers. Parks-Cramer Co.

111 **Bonnetless Valves**—Such advantages as simplicity of design, fewer parts, elimination of stud, nut and union corrosion, lower maintenance cost, and others are described in 16-pp Catalog 700 on bonnetless forged steel valves. Photos and cutaway drawings point out design features, and flow charts, capacity tables, and materials specifications are included. Velan Engineering Ltd.

112 **Diaphragm Motor Valve**—Bulletin J-170 describes outstanding features of company's diaphragm motor valve designed for accurate control of pressure, temperature, rate of flow, and liquid level. Cutaway view showing component parts is included, along with data on materials of construction, capacity tables, and flow diagram. The Jordan Corp.

113 **Unions and Valves**—Catalog 56, 22 pp, contains complete engineering data on company's line of hot forged steel products, including regular and double extra heavy, orifice, lug nut, male and female, stainless steel and alloy unions, and single union, double union and spring controlled check valves. Cutaway views show design features and tables list pertinent information. Catawissa Valve and Fittings Co.

114 **Steel Fittings**—Bulletin A-3-56, 28 pp, contains complete dimensional, engineering and application data on company's forged screwend and socket-welding fittings for high pressure service. Features organization of data in simplified charts and covers materials selection, pressure ratings, pipe thread and socket-welding specifications and hydraulic and mathematical tables. W-S Fittings Div., H. K. Porter Co., Inc.

VIBRATION CONTROL

116 **Machinery Mounting** — Containing an actual sample of Unisorb machinery mounting, this folder gives information and specifications on the various grades recommended for use under different types of machinery. Highlights advantages, gives load ranges, ordering and specification data. The Felters Co.

117 **Shock, Vibration Control** — Catalog SVC-55 discusses the basic theory of vibration isolation and shock absorption. Covers various types of machinery vibration, gives basic data, formulae and graphs, and reviews practical methods of shock and vibration control. Industrial Div., T. R. Finn & Co., Inc.

INSTRUMENTS, CONTROLS

118 **Instrument Panels**—Power and process plants can choose instrument and control panels to meet their individual specifications from six standard designs described in 16-pp Product Specification G71-7. Complete specifications are furnished, as well as information on supports and mountings for tubes, wires and equipment, instrument mounting dimensions, and dimensions of standard instrument and control panels. Bailey Meter Co.

119 **Dial Thermometers**—Features and general specifications for company's dial thermometers with anti-parallax Maxivision dial are covered in 8-pp Bulletin 149. Selection tables are included, as well as dimensional drawings. Manning, Maxwell & Moore, Inc.

120 **Combustion Controls** — Bulletin CG-71 is a concise 20-pp price manual covering company's entire Fireye product line. It will aid in ordering new equipment and parts and serve as a condensed reference. Sections in the booklet pertain to panel control systems, flame safeguards and programming controls, flame indicators and alarms, flame scanners, control enclosures, operating controls and limit switches, smoke density indicators and recorders, others. Combustion Control Div., Electronics Corp. of America.

121 **Cooling Controls** — Bulletin 710B describes company's self-powered cooling controls for compressors, stills, solvent coolers, degreasers, oil coolers, small engines, condensers, others. Includes operational drawing and hook-up sketches. Sarco Co., Inc.

122 **Automatic Burner Control** — Bulletin CF-21 describes Fireye primary control system for light oil or gas-fired automatic commercial burners. Full operating data is included, illustrated with photos and drawing, and containing dimensional drawings and specifications. Electronics Corp. of America.

123 **Thermal Conductivity Analyzer**—Versatility and accuracy are among the advantages of the Model 7C thermal conductivity analyzer described in Bulletin 119. Operating principle is illustrated, typical applications are highlighted, and technical data given. Arnold O. Beckman, Inc.

COATINGS AND CORROSION PROTECTION

124 **Adhesives and Coatings**—Special characteristics and advantages of water base adhesives and protective coatings for industrial insulations are described in Bulletin I-F 46. Includes asphalt, tar, resin and rubber base emulsions and dispersions having wide bonding and protective coating uses in air conditioning, refrigeration, sound-deadening and fields of moisture, corrosion control. The Flintkote Co.

On pages 241-242 are two postage-free Reader Service Cards provided for your convenience in ordering these bulletins. You may also use the cards to order any literature mentioned in ads.

125 **Wall Coating**—Advantages of company's solvent type acrylic wall coating are presented in this illustrated 12-pp bulletin. Typical applications are pictured and specifications for using the coating are included. National Coatings Corp.

126 **Corrosion Proofing** — Latest developments in the corrosion field are discussed in this 8-pp reference manual on corrosion proofing, CP-614A. Included are descriptions of the application of Corlok, a chemical resisting mortar resistant to sulfation and highly concentrated acids at temperatures to 1900 F for long periods. Features specific applications, benefits, limitations, working and handling properties, chemical resistance and performance records. Pennsalt Chemicals, Pennsylvania Salt Mfg. Co.

ELECTRICAL EQUIPMENT

127 **Wound Rotor Motor**—Construction details of wound rotor motors for a variety of applications where high starting torque with low starting current is needed are described in Bulletin 51B8195A. Photos and cutaway drawings illustrate important features. Allis-Chalmers Mfg. Co.

128 **Hollow Shaft Motors**—Bulletin GEA-6521, 6 pp, discusses design features and performance of company's vertical pump motors, 7½ through 30 hp. A cutaway view illustrates important design and operation features. General Electric Co.

129 **Synchronous Motors**—Construction features of company's large end-shield bearing synchronous motors, which feature combined protection and accessibility, are described in Bulletin 05B8305. Standard construction features, modifications and excitation are among subjects covered. Allis-Chalmers Mfg. Co.

BULLETINS

(Begins on page 21)

130 **Hydraulic Pump-Motor**—Catalog Section G-112 contains specifications and ordering information on the Gerotor hydraulic pump-motor. Diagrams, photos, and performance charts are included. Gerotor May Corp.

131 **Aerial Cable**—Publication 19-266 features aerial cable for electric utility and industrial power distribution systems, including preassembled, preassembled reverse-lay, field assembled and messenger and ring type. A discussion on application of aerial cable and when to use aluminum conductors is included, as well as comparative costs of aerial versus open wire installations. General Electric Co.

132 **Interlocked Armor Cable** — Publication 19-555, 18-pp, covers interlocked armor cable designed specifically for primary and secondary feeders in industrial power distribution systems and for generator leads, station auxiliaries, and station control cables in electric power stations. Components needed for a complete system are listed, along with installation information and other data. General Electric Co.

133 **Cable Trough**—Bulletin 256-F, 12-pp, describes cable trough and accessories for holding cables in all types of industrial applications. Advantages are listed and complete dimensional data is included, along with diagrams illustrating design features, specifications and other information. P-W Industries, Inc.

134 **Load Center Transformers** — Twelve-pp Bulletin CS-1000 contains engineering data, weights and dimensions on company's complete line of load center transformers. Covers construction features on liquid-filled and dry-type units for indoor or outdoor installation, with illustrations and drawings of typical applications. Standard accessories are also covered, as well as ratings available, types of core and coil assemblies. Kuhlman Electric Co.

135 **Storage Batteries**—Bulletins 168 and 334 describe pocket plate nickel cadmium storage batteries, showing economic advantages and giving tabular data for various applications. Bulletin 334 covers control and standby batteries for switchgear, standby power and emergency lighting, and Bulletin 168 describes batteries for starting heavy-duty gas, gasoline and diesel engines, operating fire pumps, standby generators and remote power sources. Nickel Cadmium Battery Corp.

136 **High-Frequency Capacitors**—Pyranol capacitors, generally designed for power-factor improvement in circuits operating at frequencies from 500 to 12,000 cycles per second, are described in Bulletin GEC 1346A. Applications with induction heating equipment for melting, forging and hardening operations are discussed, as well as series applications on the load side of a high-frequency generator, where they supply a reactive component to the generator windings and tend to neutralize its reactance. General Electric Co.

137 **Insulation Products**—Fabricating methods for electrical insulation parts are described in 20-pp Catalog 19, which includes specification data covering materials and their characteristics, as well as listing prices. Describes rag paper insulation strips and coils, plain or cuffed, creaser-cutter machines, crimped paper insulating coils, formed fibre slot wedges, hard maple wood wedges, asbestos base plastic wedges. Insulation Manufacturers Corp.

138 **Splicing Kit**—Instructions and application information for the entire line of Scotchcast splicing kits are presented in this 12-pp booklet. Describes in detail the Unipak container of electrical insulating resin No. 4 for pouring field-encapsulated splices and the three types of splicing kits with which it is used. Applications in which the electrical resin can be used for making poured splices without a splicing kit are also given. Minnesota Mining and Mfg. Co.

139 **Electrical Testing Services**—Form 101, 72 pp, contains more than 70 photos and covers typical measurements and determinations made on hundreds of products and materials. In addition, it catalogs laboratory equipment for assignments in testing, applied research, and engineering analysis. Information is subdivided into areas of chemical, electrical, electronic, mechanical and physical, and photometric, radiometric, and colorimetric testing. Similar information is given on spectroscopy, photomicrography, environmental, near infrared and ultraviolet testing. Also covers in-plant check of instruments, test sets, and apparatus; audits of testing and quality control procedure; audits of specification compliance procedure; and inspection and witness testing of wire, cable, transformers, generators. Electrical Testing Laboratories, Inc.

STEAM GENERATORS

141 **Steam Generators** — Two engineering bulletins cover company's Type A and Type S water tube steam generators. Bulletin 55-2 describes the former, and Bulletin 56-1, the Type A shop-assembled boilers. Both bulletins include descriptive text, photos and separate data sheets of engineering drawings and technical information. Drawings included offer dimensions of external and internal construction features, as well as complete boiler data—furnace volume with different fuels, boilerheating surface, and number of tubes incorporated. The Wickes Boiler Co.

142 **Wet Back Boilers**—Catalog AP-295A gives product description, plus dimensions and engineering data, to help in specification and installation of company's 900 Series "wet back" Scotch type boilers, engineered for natural draft applications. Specification and heater data are tabulated. Pacific Steel Boiler Div., National-U. S. Radiator Corp.

TUBING, ACCESSORIES

143 **Carbon and Stainless Tubing**—New tolerances and additional size ranges for square, rectangular and round carbon and stainless steel welded mechanical tubing are described in this series of three pocket-size data bulletins. Charts list tube, wall and cut length tolerances for hot and cold rolled carbon and stainless steel tubes, in addition to chemical analyses and weight. Physical properties—strength, ductility and hardness—are given in detail as welded normalized, drawn, mandrel drawn. Steel and Tubes Div., Republic Steel Corp.

144 **Tube Tools**—Eight-pp Bulletin 58 describes advantages and application of company's line of tube cleaners, tube expanders and maintenance tools, including drills, brushes, accessory and specialty tools. Photos are included, as well as size and selection data. Airetool Mfg. Co.

145 **Tube Expanders**—Catalog 88, 119-pp, is crammed full of detailed information about tube expanders and associated tools used for tube rolling. Profusely illustrated, catalog is of interest to plant engineers concerned with maintenance or manufacture of boilers, condensers, evaporators or miscellaneous heat exchangers. Sections are devoted to expanders, general accessories, measuring instruments, rollers, extensions and drives. Each type of equipment is described, applications are listed, and tables of engineering data included. Also covers tube expansion methods, tool maintenance, expansion calculations and charts giving pipe and tube sizes. Thomas C. Wilson, Inc.

MATERIALS HANDLING

146 **Handling Equipment** — Catalog 400, 50-pp, contains complete specifications on company's line of material handling equipment, including fork trucks, platform trucks, tractors and trailers. Operating advantages are discussed and typical applications are pictured. The Mercury Mfg. Co.

147 **Overhead Trolley Conveyors**—How to get maximum performance and longest service life from overhead trolley conveyors is the subject of this bulletin. Detailed sketches of the various parts of trolley conveyors illustrates the points at which checks should be made periodically by the maintenance man. Rapistan-Keystone, Inc.

148 **Telescopic Conveyors** — Descriptions of time-saving loading and unloading systems for trucks, trailers, box cars, handling cartons and bags, utilizing Telescopic conveyors, "Flopover" curves and mobile docks are featured in 24-pp Catalog 102. Fully illustrated with drawings, diagrams, and installation photos, catalog includes suggested systems for various types of handling problems. The Wilkie Co.

Postage-free Reader Service Cards make it easy to order catalogs. Cards are provided on pages 241 and 242.

149 **Lightweight Conveyor**—Uses and advantages of lightweight overhead conveyor units are described in 8-pp Bulletin 954. Illustrates and describes ten typical industrial applications and includes complete specifications. Jervis B. Webb Co.

150 **Conveyor Belt Carriers**—Bulletin 355, 16 pp, describes carriers designed for general service on all types of belt conveyor installations, including die cast, non-contact labyrinth seal, spun end inter-changeable rollers, jig welded steel frame, precision type ball bearings and Timken roller bearings. Photos, diagrams, cutaway drawings, and dimension tables are included. Stephens-Adamson Mfg. Co.

151 **Hydraulic Jacks, Pullers**—Bulletin Hydraulic-56, 16 pp, features company's line of hydraulic jacks and pullers. Prepared as an application guide for using various high-pressure jacking and pulling tools, it contains full descriptions, mechanical specifications and size charts, as well as illustrations of equipment in use. Templeton, Kenly & Co.

152 **Heavy-Duty Excavator**—Eight-pp Bulletin K461 tells the story of design, construction, work capacity and application of company's heavy-duty, 25-ton, ¾ cu yd dipper capacity excavator. Photos and diagrams point out important features of the unit when equipped with accessories. Koehring Co.

CONSTRUCTION

153 **Faced Steel Plate**—Catalog MRG-444 describes advantages of rubber faced steel plate in applications where abrasion wear, impact wear, and corrosion are a problem. How various industries are cutting maintenance costs with the use of this plate is detailed, covering handling of sand, gravel and concrete, metalworking, mining, coal handling, grain, seed and soybean handling, chemical, and material handling. The Gates Rubber Co.

154 **Floor Plate** — Bulletin AD-206 describes a floor surfacing armor which is economical and will add substantially to the life of heavy-traffic industrial cement floors. Simple instructions and illustrations reveal economy, durability and ease of installation of the product. Acme Steel Co.

MECHANICAL POWER TRANSMISSION

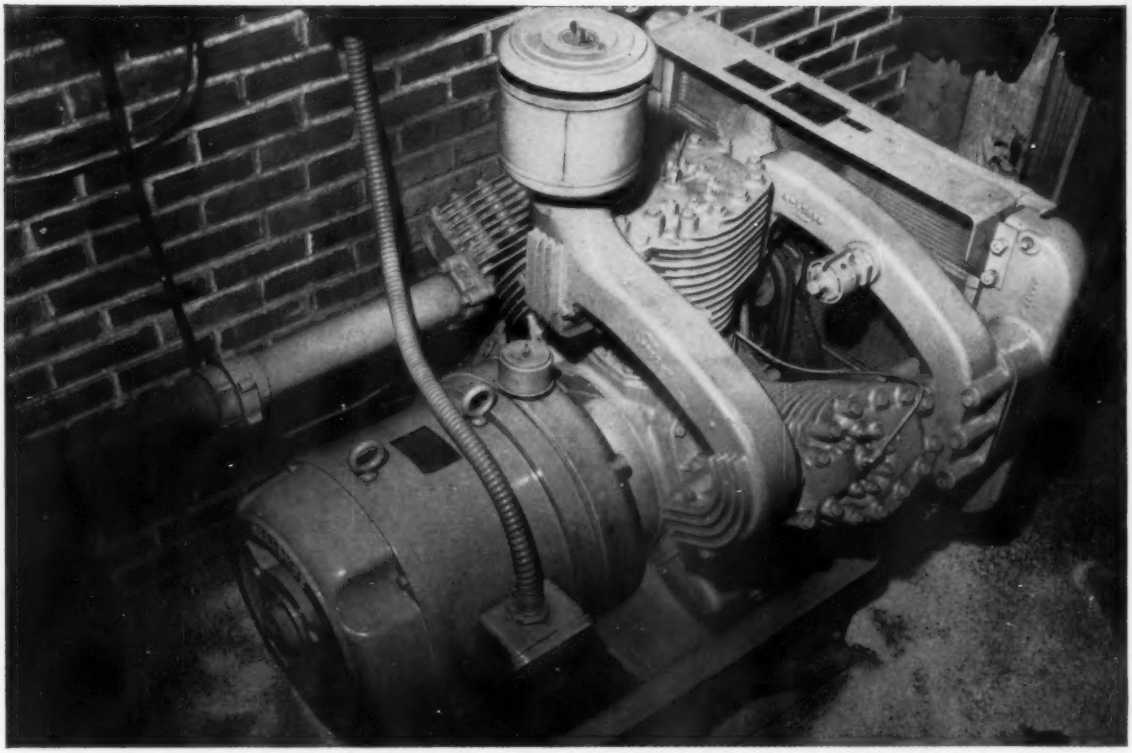
156 **Multiple Drive System** — Form F-1910 describes the Varidyne multiple drive system which provides simultaneous speed changes and equal distribution of load. Several examples of basic Varidyne applications are sketched and explained, and some installations shown. U. S. Electrical Motors Inc.

157 **For Multiple V-Drives**—Catalog MVD-56, 18 pp, describes company's Ful-Grip Q-D Sheaves, standard multi-V sheaves, and made-to-order sheaves, and gives practical information on the handling of sheaves as well as dimensions and descriptions. Illustrations, tables and charts give full data. Maurey Mfg. Corp.

158 **Machine Tool Clutch**—Bulletin ECP-656 describes applications of company's Electro Clutch designed for use where many output speeds are desired with a constant input speed. Various installations of this electrically controlled clutch are pictured and comparative sizes shown. I-T-E Circuit Breaker Co.

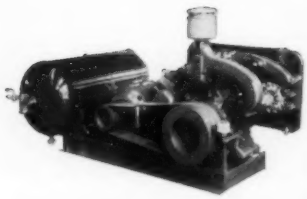
159 **Self-Aligning Couplings**—Bulletin 60, 8 pp, describes company's self-aligning couplings which handle misalignment up to 3 deg at ordinary gear type coupling prices. Performance characteristics are fully detailed, cutaway photo showing inside construction is included, along with dimensional and specification data. Ajax Flexible Coupling Co. Inc.

(More Bulletins on page 243)



SAVE ALMOST A MILE EVERY HOUR IN PISTON WEAR* WITH A JOY WL-80 COMPRESSOR—

** Piston speed is lower than that of four comparable compressors. So low that you save over 6½ miles of wear each 8-hour day.*



Joy WL-80 "Packaged Unit" Compressor can be delivered ready-to go, complete with air receivers, piping and wiring.

NEED A SMALL, COMPACT COMPRESSOR as an auxiliary air supply? Or possibly you want a compressor that can be placed right where the air is used and eliminate long runs of piping.

If your requirements call for 640 CFM or less, there's a Joy WL-80 for you:

- *15 to 125 HP.*
- *81 to 641 CFM.*
- *Pressures to 125 psi, standard. (High pressure units to 250 psi).*
- *Single or two stage.*
- *Air cooled.*
- *Force-feed lubrication.*
- *Eleven models.*

. . . And, you have your choice of drives: Direct, V-Belt, Flange-Mounted. In fact, these compressors are available as packaged units, like that shown at the left, delivered complete with air receivers, piping and wiring.

* * *

Get full details by writing for complete information. ● **Joy Manufacturing Company, Oliver Building, Pittsburgh 22, Pa.** In Canada: *Joy Manufacturing Company (Canada) Limited, Galt, Ontario.*

Consult a Joy Engineer

Write for FREE Bulletin 120-15

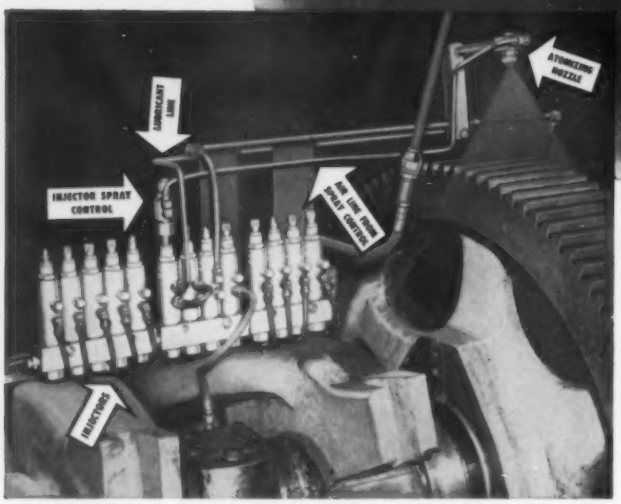
JOY

W&D 1 5377

SPECIALISTS IN THE COMPRESSION AND MOVEMENT OF AIR AND GASES SINCE 1885

For more facts circle 514 on Reply Card

Now– SOLVE Production Spray with the NEW Lincoln ...for maintenance

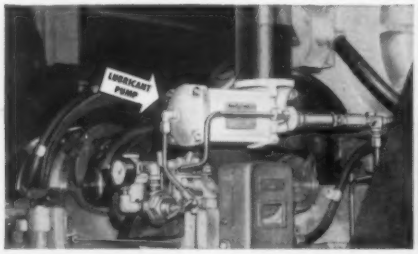


MistOmatic Spray Control Assembly, operating as component of Lincoln Centralized System to automatically apply lubricant mist to open gears while—simultaneously—all other bearings on the press are lubricated in seconds.

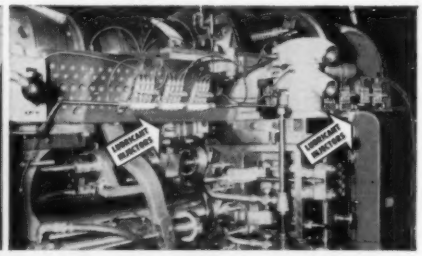
AUTOMATIC MIST LUBRICATION simultaneously with centralized closed bearing lubrication

The economical, positive and efficient way to combine open gear and closed bearing lubrication in one automatic system! New, exclusive Lincoln MistOmatic Spray Control Valve is designed for use with Lincoln power-operated Centralized Lubrication Systems. It dispenses a controlled quantity of mist lubrication on open gears and chains, cams, rollers, eccentrics, slides and ways, circular saws and similar surfaces. *Simultaneously,* the balance of the bearings of the machine are automatically lubricated with pre-measured quantities of lubricant by the Centralized System injector circuit.

Positive "mechanized maintenance" for automated machine groups and components



Close-up view of low pressure Lincoln Power Drive Pump with air return and self-contained lubricant reservoir, automatically time clock controlled, installed on a Six Spindle Conomatic.



Lincoln Pumping Unit illustrated supplies heavy duty Way Oil to lubricant injectors shown above, serving 78 bearings, simultaneously each time System is cycled.

Designers and builders of Multi-Lube for passenger cars, trucks, busses and industrial equipment.

Lincoln Power-Drive Centralized Lubrication Systems are designed for automatic application of viscous or fluid lubricants at controlled time intervals for individual machine units. Maintenance of a proper, pre-measured film of refinery-pure lubricant on all bearing surfaces is assured. Timing and control devices are incorporated to suit individual machine requirements, based on such factors as operating speed, load and duration of operation. Also the ideal System for machines in automated production lines... machine units can be interchanged without disturbing lubrication system.

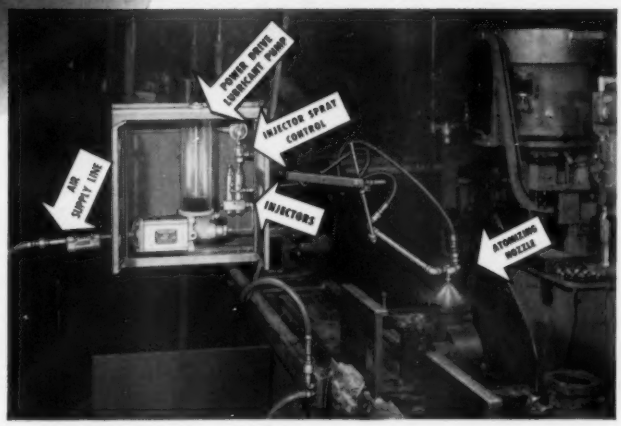
Lincoln *The most trustworthy name in lubricating equipment*

Application Problems
MISTOMATIC SYSTEM
...for production

AUTOMATIC ASSEMBLY LINE SPRAY APPLICATION of paint, glue, grease, oil

Lincoln pioneers a major step toward complete assembly line automation... to boost your profits! The MistOmatic Spray is being used throughout industry—with great success—for production line spraying of grease, oil, paint, glue, and similar materials. As production components pass the spray control valve, it actuates automatically and applies a measured quantity of fluid to each unit! Quantity of material sprayed, and pattern of spray, can be adjusted to your needs.

These Lincoln spray control valve assemblies can also be used *without* spray attachment for automatic application of various materials to production components, and for automatic application of die lubricants. Prevent waste... cut costs... save manpower ...and enjoy maximum versatility of application. Get complete details now!



MistOmatic Spray Control arranged alongside of production line to automatically apply lubricant mist to gear box components.

• Send for these new free Bulletins...

Detailed information and specifications on Lincoln Automated Power-Drive Centralized Lubrication Systems... and Lincoln MistOmatic Spray Control Valve Assemblies. These bulletins describe how you can "build in" automatic maintenance and automatic spray applications for your *automated lines... machine tools... production equipment... materials handling equipment!*

NATIONAL SALES AND SERVICE THROUGH LEADING INDUSTRIAL DISTRIBUTORS

SALES AND SERVICE OFFICES

BERKELEY, CALIF.	Lincoln Engineering Co. of Calif.	3033 San Pablo
BOSTON, MASS.	H. G. Davis, Inc.	8 St. Mary's Street
BRIDGEPORT, CONN.	H. G. Davis, Inc.	195 Dewey Street
CHICAGO, ILL.	Lincoln Engineering Co. of Ill.	2415 S. Michigan Ave.
CLEVELAND, OHIO	Lincoln Lubricating Systems, Inc.	4500 Euclid Ave.
DETROIT, MICH.	Lincoln Engineering Co.	8627 Woodward Ave.
FORT WORTH, TEXAS	Fritz Keller	P. O. Box 9008
LONG ISLAND CITY, N. Y.	Lincoln Lubricating Systems, Inc.	48-14 36th Street
LOS ANGELES, CALIF.	Lincoln Engineering Co. of Calif.	2844 S. Grand Ave.
MAPLEWOOD, N. J.	Lincoln Lubricating Systems, Inc.	1603 Springfield Ave.
MILWAUKEE, WIS.	Lincoln Engineering Co. of Wis.	3057 N. 35th Street
PAWTUCKET, R. I.	H. G. Davis, Inc.	587 Pawtucket Ave.
PHILADELPHIA, PA.	Lincoln Engineering Co.	1609 Vine Street
PITTSBURGH, PA.	Lincoln Engineering Co.	134-36 S. Whitfield
PORTLAND, ORE.	Lincoln Engineering Co. of Calif.	1018 E. 8th Ave.
TORONTO 2-B, ONTARIO	Lincoln Engineering Co. (Canada) Ltd.	81 John Street

LINCOLN ENGINEERING COMPANY
Division of the McNeil Machine & Engineering Co.
5702-26 Natural Bridge Ave., St. Louis 20, Missouri

To LINCOLN ENGINEERING COMPANY
Division of the McNeil Machine & Engineering Co.
5702-26 Natural Bridge Avenue
St. Louis 20, Missouri

Please send me new Bulletins 806-R and 809.

Name.....

Company.....

Address.....

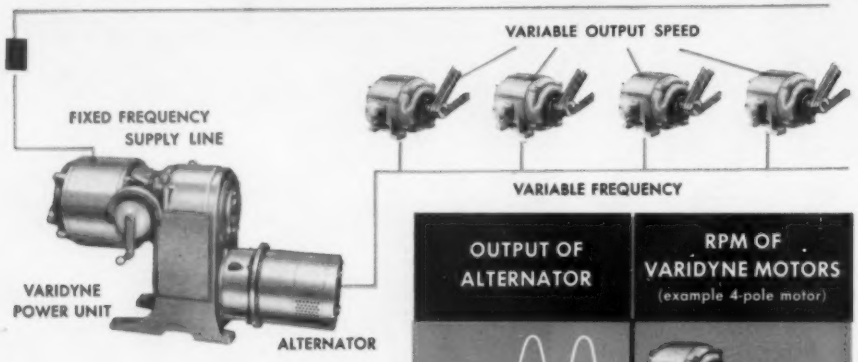
City.....*Zone*.....*State*.....

For more facts circle 515 on Reply Card

For more facts circle 516 on Reply Card →

New Varidyne system . . .

Schematic of Coordinated Variable Speed System



OUTPUT OF ALTERNATOR	RPM OF VARIDYNE MOTORS (example 4-pole motor)
60 CYCLES	1800 RPM
30 CYCLES	900 RPM
120 CYCLES	3600 RPM

***Now* you can obtain variable speed from AC squirrel cage motors**

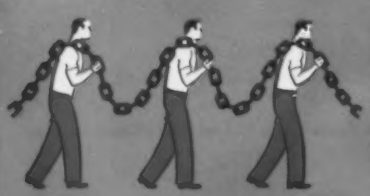
In this conveyor of the Dolly Madison Plant of Interstate Bakeries Corporation, a baker's dozen drive motors are used—13 U. S. double-reduction gearmotors. All are controlled to matched speed from the power unit.

HOW *Varidyne* WORKS

The principle of Varidyne is based on the fact that AC motors operate at a speed proportional to the frequency of applied power. As shown in the chart above, a 4-pole induction motor which normally operates at 1800 rpm on 60 cycles will operate at 900 rpm at 30 cycles, or 3600 rpm at 120 cycles. Because power lines operate at fixed frequency, AC motors operate at fixed speeds. The Varidyne system converts the fixed line frequency to a variable frequency by means of a Varidrive and alternator combination (power unit). This variable frequency is used to power one or more AC induction motors which then can be controlled simultaneously by regulating the power unit.

WHAT *Varidyne* CAN DO

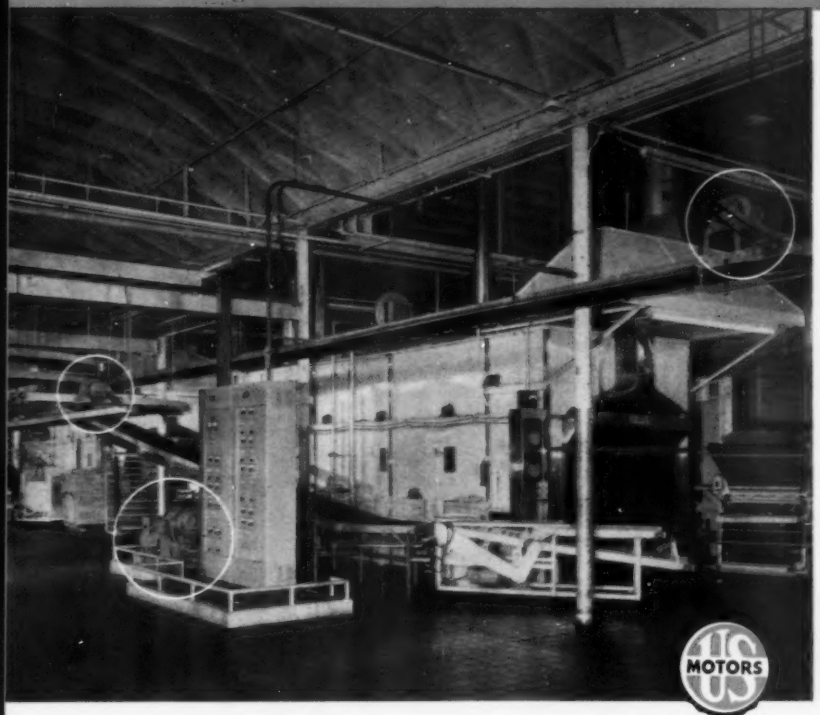
By the use of simple AC induction motors at the point of power application, Varidyne now provides the simplest and most dependable variable speed, multiple drive system obtainable. Motors of different speeds or types can be used in the same system and will change speed proportionately. Single motor systems can be supplied for applications with limitations of space, weight, temperature, vibration, etc. The rugged AC motors and circuitry of the system insure long trouble-free life, which reduces maintenance costs and eliminates special training for maintenance personnel.



EQUALIZED LOAD DISTRIBUTION *automatically* ACHIEVED

When the Varidyne motors are operating in tandem, as on a single conveyor, they will *equally* share the load. In earlier systems without equal load distribution, it was common practice to "overdesign" the conveyor with extra capacity motors, gears, chains and sprockets in order to withstand higher loads at any one point of the conveyor. Damage from extreme overloads was prevented by shear pins which caused frequent breakdowns and production interruptions. Varidyne motors eliminate this costly, troublesome practice.

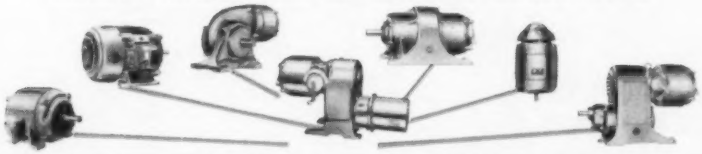
a simple means for simultaneous speed variations



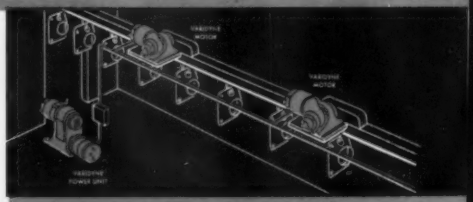
VARIABLE SPEED MULTIPLE DRIVES CAN NOW BE COORDINATED AND *automatically* CONTROLLED

Varidyne may be furnished with Varitrol pneumatic control, which operates *automatically* in response to a signal from the process or operation. The trouble-free operation of many Varidyne systems already in use has caused this new multiple drive system to be enthusiastically received throughout the nation. U. S. field engineers are prepared to give counsel and special service in applying Varidyne to meet your specific application.

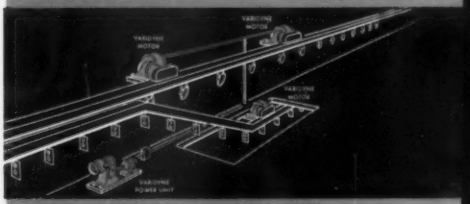
VARIDYNE OFFERS WIDE SELECTION OF MOTOR TYPES



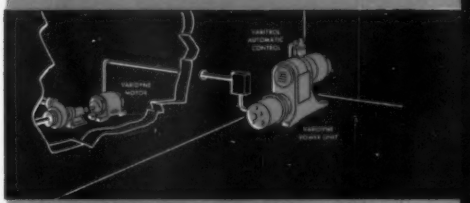
Selection of enclosure and speed range of Varidyne motors driven by the central Varidyne Power Unit is practically unlimited, including drip-proof, totally-enclosed and explosion-proof designs. Speeds of from 1 to 10,000 rpm are available in ratios of up to 5:1 and higher. Varidyne motors can be provided with integral gearing or with integral variable speed transmission for speed trimming. Varidyne motors can be furnished from ⅓ to 25 H.P. at maximum RPM. Power Units 1 to 50 H.P. connected load.



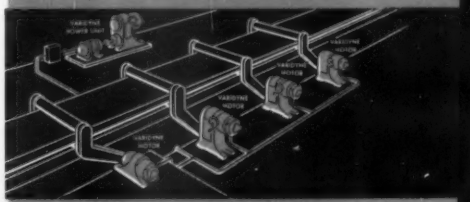
TANDEM MOUNTED DRIVES – The above example demonstrates two or more Varidyne motors driving a single conveyor. An important feature is the equal distribution of load between the Varidyne motors.



TWO MACHINES WITH PROPORTIONAL SPEEDS – Two or more machines or conveyors may be driven at same speed or at proportional speeds by a single Varidyne Power Unit.



SPECIAL CONDITIONS—One or more Varidyne induction motors meet special conditions such as restricted space, weight limitations, environmental hazards, etc., at the point of power application.



INDIVIDUAL DRIVE SPEED ADJUSTMENT – Varidyne motors with individual variable speed control can be used for trimming the speed within a system. The speed of the entire system can then be controlled simultaneously.

Send for free Varidyne bulletin

U. S. ELECTRICAL MOTORS Inc. PLE-9
P. O. Box 2058, Los Angeles 54, Calif., or Milford, Conn.

NAME_____

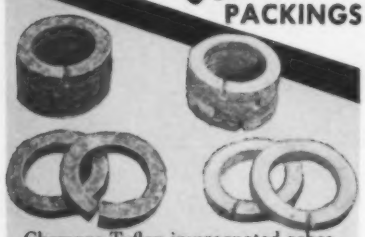
COMPANY_____

ADDRESS_____

CITY_____ ZONE____ STATE_____

U.S. Electrical MOTORS

CHEMPRO
Teflon-Impregnated Asbestos
PACKINGS



Chempro Teflon impregnated asbestos packings provide the chemical resistance of Teflon and at the same time have the strength and resilience of asbestos. They are far superior to conventional lubricated asbestos packings, since the Teflon gives protection from chemical attack to the asbestos.

CHEMPRO STYLE 500 PACKING is designed for pumps and equipment handling hydrocarbons, light solvents and other volatile products. *Do not use on acid or strong caustics.* It is composed of 85% white asbestos yarn square plaited and thoroughly impregnated with Teflon.

CHEMPRO STYLE 600 PACKING is designed for applications handling acids, strong caustics and other corrosives. It is made of 100% Blue Cape asbestos, square plaited and thoroughly impregnated with Teflon.

Chempro Teflon impregnated asbestos packings are available in standard sizes from ⅛" up to 1¼", by 1/16", either on spools by the pound or in die molded or mandril cut rings or ring sets.

Ordering Information for Rings and Ring Sets

1. Give shaft diameter and stuffing box bore and depth.
2. Number of rings required.
3. For standard equipment, specify make and serial number.
4. State if seal cage is used.

THE ORIGINAL FABRICATORS OF TEFLON PACKINGS AND GASKETS

*duPont Trademark

CHEMICAL & POWER PRODUCTS, Inc.

7 Broadway, New York 4, N.Y.

For more facts circle 517 on Reply Card

BACKTALK about our past issues

Edited by Marjorie E. Weissman

Reducing Noise Level

PLANT ENGINEERING:

"We were very interested in the article entitled 'Noise Reduction Comparisons' by D. B. Callaway of the Industrial Sound Control Div., Koppers Co., Inc., which appeared in the April, 1956 issue of PLANT ENGINEERING.

"At present, we have been unable to obtain more detailed information on the Soundmetal Panels mentioned in the article.

"Any assistance you can give us in obtaining this information will be appreciated." *Freeman C. Lewis, Plant Engineering Department, Taylor Instrument Companies, Rochester, N. Y.*

► Industrial Sound Controls, Inc., 45 Granby, Hartford 12, Conn., are the people to contact about the panels mentioned in our article.—*Editors.*

Copper-Free Condulets

PLANT ENGINEERING:

"I have just noticed Item 109 on page 21, 'Bulletins and Catalogs' of your March, 1956 issue. This item mentions our Bulletin 2681, 'Aluminum Condulets' and says that it lists 'copper-aluminum condulets, etc.'

"The phrase 'copper-aluminum' is entirely erroneous. The phrase should be 'copper-free aluminum.' This error is most unfortunate, as the quality of freedom from copper is the most important feature of aluminum equipment for use in many highly corrosive locations. In fact, it is the presence of copper that most usually renders aluminum susceptible to corrosion. This is explained on page one of the bulletin." *John B. Crosby, Advertising Manager, Crouse-Hinds Co., Syracuse, N. Y.*

► We regret the error that changed "copper-free aluminum" to "copper-aluminum" in our reference to a bulletin. A corrected description of the condulets appears in the Data File of Commercial Literature in this issue.—*Editors.*

New Series on Fluid Power Maintenance

PLANT ENGINEERING:

"With reference to your series of articles on Fluid Power Maintenance, starting in the June, 1956 issue, with '1. Installation of Hydraulic Systems,' our Repair Shop Superintendent, Jim Goulding, expressed a very complimentary opinion of the article and, at the same time, voiced his disappointment that the second installment did not appear in the July issue.

"Do you intend to continue this series and, if so, will tear sheets of all articles be made available? We are much interested and believe the complete set will result in a good text on the subject." *R. W. Hiller, Plant Engineer, Dravo Corp., Engineering Works Div., Pittsburgh, Pa.*

► Our present plans call for publishing this series on Fluid Power Maintenance, consisting of 12 articles, bi-monthly. Tear sheets will be available as the articles are published.—*Editors.*

Welding Machine Maintenance

PLANT ENGINEERING:

"In the June, 1956 issue of PLANT ENGINEERING, we read with much interest the article on 'To Maintain Welding Machines, Know Them,' written by Mr. H. G. Thoma of Linde Air Products Co., Newark, N. J.

"We find this article very interesting and helpful and would like to pass the information on to several of our associates.

"Would it be possible to obtain about three reprints of the article in question. We would be happy to pay for them." *S. J. Matosec, Plant Engineer, Pullman-Standard Car Manufacturing Co., Hammond, Ind.*

► Three sets of tear sheets have been sent to Mr. Matosec with our compliments.—*Editors.*

Tracking Maintenance Expense

PLANT ENGINEERING:

"We are studying various ways of recording maintenance expense in order to arrive at the form which best lends itself to analysis in relation to productive activity and for comparison with other plants.

"Our present thoughts include the segregation of general building and grounds expense from the cost of maintaining production facilities and the interpretation of the labor and of the material incurred in the latter in the following terms:

(a) For our Foundry, in dollars per ton cleaned castings poured.

(b) For our Engine Plant, in dollars per engine produced.

(c) For our Machine Shop and

In water conditioning... one grows taller than the rest!

W. H. & L. D. BETZ, Philadelphia, Pa.

DO YOU WORK WITH ELECTRONIC EQUIPMENT?

you need these two new RCA

TUBE BOOKLETS!

Important additions to your technical library, these two new RCA publications contain valuable data and descriptions of approximately 300 RCA tubes as applied to industrial electronics.

RCA Power and Gas Tubes (PG-101B)—24-page book contains descriptions, terminal connections, technical information on 178 RCA vacuum power tubes, rectifier tubes, thyratrons, ignitrons, magnetrons, and vacuum-gauge tubes. The most up-to-date book of its kind in the industry.

Receiving-Type Tubes for INDUSTRY and Communications (RIT-104)—New, up-to-the-minute technical information on 126 RCA receiving-type tubes especially suited to industrial electronics. Includes technical data, socket connection diagrams, and descriptions on RCA Special Reds, Premium, computer, pencil, and glow-discharge, small thyratrons, low-microphonic, and other tube types.

Write on your company letterhead to RCA, Commercial Engineering, Section I-34-T, Harrison, N. J., for a complimentary copy of RIT-104 and PG-101B.

SEND FOR THESE BOOKLETS TODAY!

TUBES FOR INDUSTRY
RADIO CORPORATION OF AMERICA

RCA ELECTRON TUBES...LONG-LASTING, DEPENDABLE...AVAILABLE THROUGH YOUR AUTHORIZED RCA TUBE DISTRIBUTOR.
For more facts circle 519 on Reply Card

BACKTALK

Stamping Plant in dollars per 100 Standard Direct Labor Hours.

"To guide us in our further planning, we would appreciate any information you could furnish in respect to industry practice in this regard and to comparative maintenance data." *E. W. Benjamin, Plant Engineering Office, Windsor Mfg. Div., Ford Motor Company of Canada, Ltd., Windsor, Ont.*

► Several articles from past issues of PLANT ENGINEERING, which we think might be helpful, have been forwarded to Mr. Benjamin. In addition, "Techniques of Plant Maintenance and Engineering" obtainable from Plant Maintenance Show, Inc., 341 Madison Ave., New York 17, N. Y., should prove useful. These books are published annually in connection with the Plant Maintenance Conferences.

One other source of information such as that sought by Mr. Benjamin is the National Association of Cost Accountants. In the NACA New York office, the man to contact would be Mr. Ray Marple, 505 Park Ave., New York 22, N. Y.—*Editors.*

Helpful In Sales Training

PLANT ENGINEERING:

"The November issue of your publication PLANT ENGINEERING, contained a very useful article entitled 'Lube Oil Specifications—Which Ones Are Important,' by Bruce M. Dunham. Recently we have been using this article to instruct Sales and Technical Services trainees at training lectures in our Ontario Division.

"As we have a limited number (six) of copies, we would ask your permission to reprint this article ourselves, for distribution to our sales personnel." *G. A. McElheran, Training Supervisor, Ontario Div., The British American Oil Co., Toronto, Ont.*

► We are pleased to hear that this article has proved helpful in instructing sales and technical services trainees and of course, are happy to give permission to reprint the article, with credit to this magazine.—*Editors.*

Carbon-Graphite Bearings

PLANT ENGINEERING:

"In your July, 1956 issue of PLANT ENGINEERING, there was an article written by Mr. B. Silver, of the Electro-Nite Carbon Co., on the use of carbon-graphite bearings. We would appreciate it if additional information could be obtained so that we may determine sizes available, as we are confronted with problems of the same nature as those described in Mr. Silver's article.

"We, at the Des Moines plant of the Firestone Tire and Rubber Company, have enjoyed reading your publication and wish to thank you for the many articles and advertisements that are so appropriate in a publication of this type, designed for plant engineers and engineering." *C. R. Allen, Assistant Plant Engineer, Firestone Tire and Rubber Co., Des Moines, Iowa.*

► This request for information about the carbon-graphite bearings has been forwarded to Mr. Silver.—*Editors.*

The P E's Role

PLANT ENGINEERING:

"I recently received the reprint, 'The Plant Engineer's Role In Industry,' from the June, 1956 issue of PLANT ENGINEERING. Needless to say, I had already read

the article. If possible, would you please send me about 50 copies of the reprint for distribution to our field men." *J. H. Layton, Jr., Manager, Foamsil Sales, Pittsburgh Corning Corp., Pittsburgh, Pa.*

► There are still a few reprints of this article available should any reader be interested in obtaining one.—*Editors.*

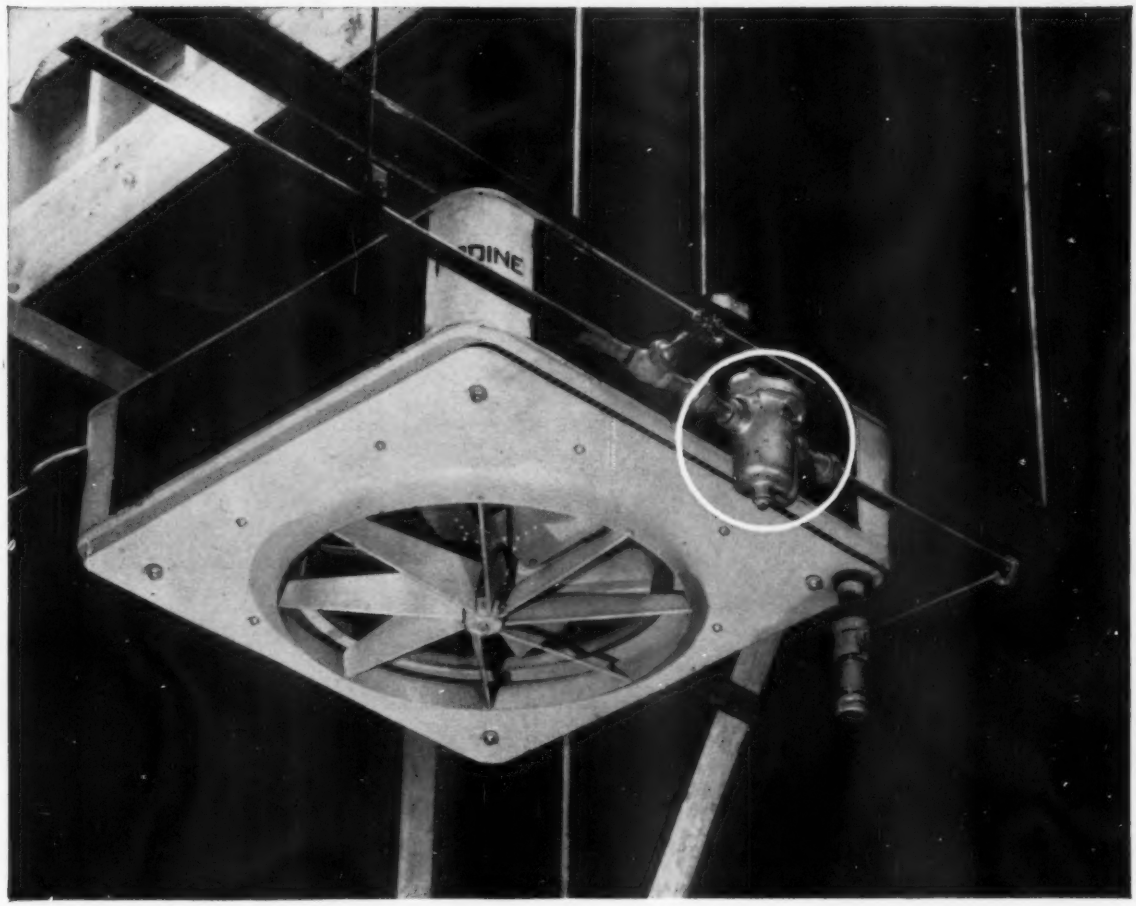
Dust Collection Via Rubber Tubing

PLANT ENGINEERING:

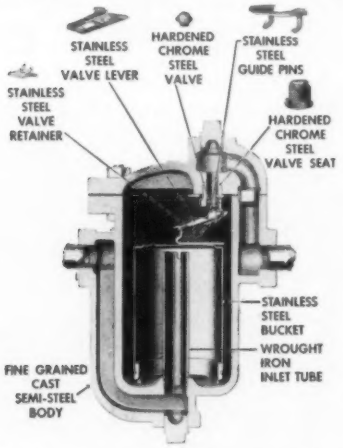
"On page 94 of the July, 1956 issue of PLANT ENGINEERING, Figure 2 in the article, 'Barrel Train Saves $2500 Monthly,' shows dust being collected via flexible rubber tubes.

"We believe we may have use for tubes of this character and we are writing to ask if you will be good enough to give us the name and address of the manufacturer of this type of tubing. We have been unable to get this information from any purchasing guides." *F. W. Enzenbacher, National Bronze Co., Springfield, Mass.*

► Several manufacturers should be able to supply this type of tubing. They include Flexible Tubing Corp., Guilford, Conn.; Boston Woven Hose & Rubber Co., 29 Hampshire, Cambridge, Mass.; and Republic Rubber Div., Lee Rubber & Tire Corp., 1419 Albert St. Youngstown, Ohio.—*Editors.*



How Corrosion of Unit Heaters is Prevented by Good Trapping


STAINLESS STEEL VALVE LEVER
HARDENED CHROME STEEL VALVE
STAINLESS STEEL GUIDE PINS
STAINLESS STEEL VALVE RETAINER
HARDENED CHROME STEEL VALVE SEAT
STAINLESS STEEL BUCKET
WROUGHT IRON INLET TUBE
FINE GRAINED CAST SEMI-STEEL BODY

Good Traps. The mechanisms in Armstrong traps for unit heaters are substantially identical in design, workmanship and materials to those used in traps for 900 lbs. pressure, 900 degrees F.

Cause. Costly corrosion of unit heaters is frequently the result of sluggish condensate drainage and inadequate venting. Any carbon dioxide gas present in the steam supply will go into solution if the condensate is below steam temperature, forming corrosive carbonic acid. Presence of oxygen aggravates the corrosion.

Remedy. Armstrong traps prevent carbonic acid formation because they discharge condensate *at steam temperature* and vent CO_2 and air at the same time. There is never any accumulation of condensate and incondensible gases to cause trouble as can occur with traps that must wait for condensate to cool before they will open.

Trap Selection. It is important that the traps be correctly sized, with a generous safety factor to provide adequate air handling capacity. Armstrong sizing recommedations are thoroughly reliable, being based on actual performance of the traps under operating conditions rather than on theoretical considerations.

Complete Details. Ask for Armstrong Bulletin No. 2312 which tells how to select and install traps for any type of unit heater. For your free copy, call your local Armstrong Factory Representative, or write:

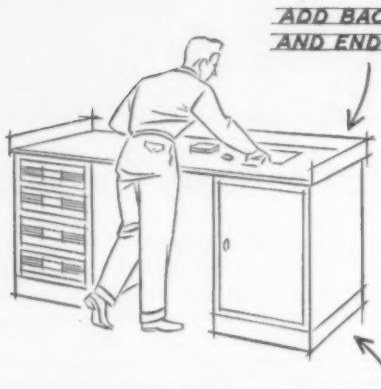
ARMSTRONG MACHINE WORKS
912 Maple Street, Three Rivers, Michigan

ARMSTRONG STEAM TRAPS *Application Engineered*

For more facts circle 520 on Reply Card

HOW TO USE STANDARD HALLOWELL UNIT WORK BENCHES AND ACCESSORIES IN PLANT MODERNIZATION

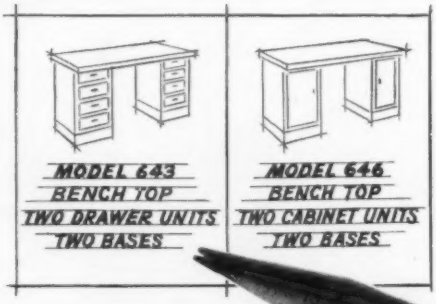
MODEL 640 - BENCH TOP, DRAWER UNIT, CABINET UNIT, TWO BASES



ASSEMBLE THEM IN CONTINUOUS LINE - JOINED IN THE MIDDLE OF THE UNITS OR BUTTED END-TO-END

USE THEM AS INDIVIDUAL BENCHES

4 TOP MATERIALS, 2 LENGTHS, 2 WIDTHS
2 HEIGHTS - ALL STANDARD



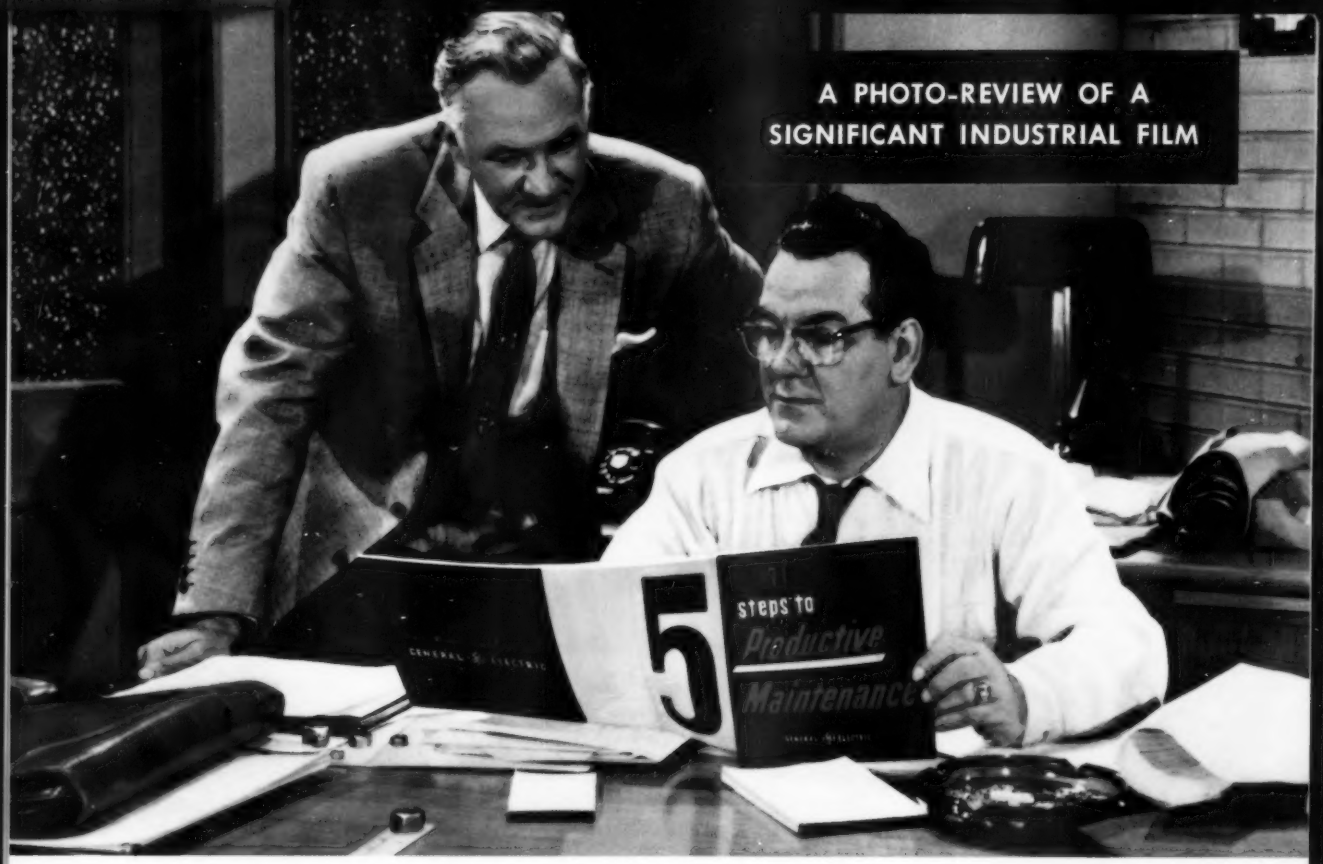
Standard Units · Standard Accessories · Sturdy Steel Construction · Stocked by leading Shop Equipment Dealers · Send for "Benchery" – a Humorous Booklet on What You Can Do with Hallowell Benches · Hallowell Shop Equipment Division, Standard Pressed Steel Co., Jenkintown 26, Pa.

HALLOWELL SHOP EQUIPMENT DIVISION
STANDARD PRESSED STEEL CO.
SPS
JENKINTOWN PENNSYLVANIA

BENCHES (CABINET, WORK, UNIT) • STOOLS AND CHAIRS • SHOP DESKS • TOOL STANDS AND CABINETS • DRAWERS, DRAWER TIERS • STEEL CARTS • SHELVING

For more facts circle 521 on Reply Card

For more facts circle 522 on Reply Card →



How Jim Hamilton of Dawson & Egglesby reduced breakdowns, increased output by switching to *Productive Maintenance*

1 IT ALL BEGAN (in this film) when Maintenance Superintendent Jim Hamilton's wedding anniversary party was interrupted by the telephone. . .

2 . . . a breakdown at the plant! Same thing on his birthday, too — just as he was blowing out the candles. In fact, the phone rang every time the Hamiltons planned something.

3 Telephonitis was afflicting Jim. It seemed the phone was always ringing to announce a breakdown at the plant. So, his doctor suggested a hobby.

GENERAL ELECTRIC

PLEASE TURN PAGE

CONTINUED FROM PRECEDING PAGE

Emergency equipment downtime was

4 That's why Jim bought a gun. He decided to hunt ducks and showed his son how it is done. The question was: when could he find the time?

5 He'd have to guarantee himself time. So he planned to isolate three days against every kind of maintenance trouble. He drew up work orders and schedules for his men.

6 They pitched in. They greased, tightened, adjusted, overhauled. And to make sure Jim got his trip, one main drive motor was greased twice.

...then he called in his General Electric

10 The cost of repairing the motor was only one of Jim's worries. More important, men and machines were idle . . . production stopped.

11 Downtime was costing a lot of money and Jim's boss, Egglesby, "Old Eaglebeak," wasn't very happy. Jim decided to call his General Electric Service Shop for assistance.

12 To George, the General Electric maintenance specialist, Jim's problem was nothing new. He told Jim he'd be over right away.

...and saw how his problem could be solved

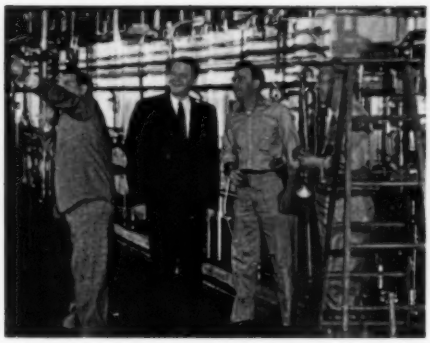
16 George pulled out some literature from his brief case and showed Jim the advantages of General Electric's *Productive* Maintenance plan...

17 "There are five steps in this new approach to maintenance. First, gather complete equipment data from your machines and motors, and compile a record system.

18 "Second, determine the amount of routine maintenance needed by deciding how much care is warranted by the function and cost of the equipment.

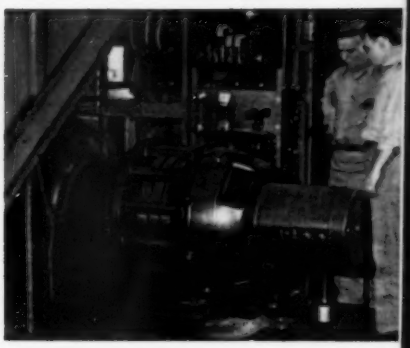
GENERAL ELECTRIC

becoming a major problem for Jim Hamilton...



7 When they were finished, the plant looked like a battle cruiser ready for the admiral. Jim was demonstrating his shooting technique when . . .

8 . . . in spite of all the overhauling and greasing they had done, one of the main drives broke down. Jim slumped as he saw the whole production line coming to a standstill.



9 Up in smoke went the main drive and up in smoke went Jim's hunting trip. Apparently a lot of maintenance wasn't the answer either.

maintenance specialist for help...

13 Jim explained his problem: what he needed was a crystal ball to tell him in advance when and where those expensive breakdowns would occur.

14 "You can have a crystal ball," said George, "part of it will be a record system that will tell you when to inspect, when to overhaul, and what your upkeep costs are . . .

15 "The rest of your crystal ball will be any good inventory control system to keep track of renewal parts. Two systems make your crystal ball."

with General Electric's *Productive Maintenance* plan...

19 "Third, put your records to work. Set up a routine operating control system, with regular inspection cycles, work orders, and spare parts stocks.

20 "Fourth, inspect and evaluate all equipment *vital* to production continuity, to help you determine critical parts protection and overhaul requirements.

21 "Fifth, establish a critical maintenance program: schedule overhauls to reduce breakdowns. Stock parts to minimize downtime cost."

...to help raise productivity, cut product cost...

PLEASE TURN PAGE

CONTINUED FROM PRECEDING PAGE

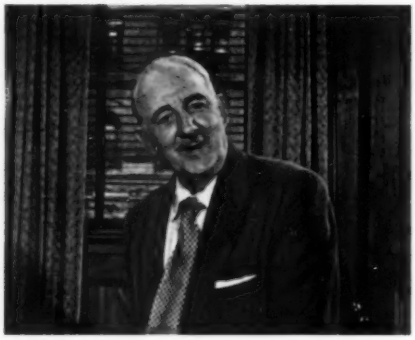
So Jim Hamilton set up his own *Productive* Maintenance program . . .

22 Jim, sold on *Productive* Maintenance, started his own program at once. Electric equipment needing overhaul was scheduled into nearest General Electric Service Shop.

23 And the stock room at Dawson & Egglesby became a model of efficiency. Now, when critical parts for key machines are needed, they're always available. As for Jim, well . . .

. . . licked his maintenance problem . . . and made his management happy!

24 . . . he always bags his limit now when he goes duck hunting. The Hamiltons never miss an anniversary celebration. And Jim's telephonitis . . . that's been cured for good.



25 One more thing: Jim's boss Egglesby, "Old Eaglebeak," was delighted. He saw production up and maintenance costs down. What management wouldn't be delighted?

How your General Electric maintenance specialist can help organize a *Productive Maintenance* program

Now that you've reviewed the highlights, SEE G.E.'s FILM: "PRODUCTIVE MAINTENANCE"

General Electric Company
Apparatus Sales Division, Section 801-19 D
Schenectady 5, N.Y.

I would like to schedule a showing of your film "*Productive* Maintenance."

Please send me the detailed manual (GEA-6087) on setting up a *Productive* Maintenance program in my plant.

NAME _____

POSITION _____

COMPANY _____

CITY _____ STATE _____

1. Supplying Complete Parts Data. He can identify all renewal parts in each unit of electric equipment to complete basic records.

2. Planning Routine Maintenance and Inspection. He can offer upkeep guidance and help organize inspection trips and routine maintenance by examining your equipment and establishing the periodic checks needed.

3. Establishing Routine Renewal Parts Inventory. He can tailor a renewal parts program to your plant, help you set up a parts inventory system.

4. Analyzing Critical Equipment for Best Protection. He can tell you how long repairs will take and the cost per job, plus recommending major spare parts protection.

5. Determining Condition of Critical Equipment. He can assess the condition of such equipment, and schedule men and machines at the nearest of 51 G-E Service Shops, to help you during planned overhauls.

To put *Productive* Maintenance to work for you call your nearest G-E Apparatus Service Shop or Sales Office.

Productive Maintenance **as vital as production itself!**

GENERAL ELECTRIC

Let's not clean away dollars and man-hours with costly, inadequate floor care

MECHANIZE *your floor-cleaning with a* COMBINATION SCRUBBER-VAC!

(Powder Dispenser and Level Cable Wind are accessories)

Wherever *combination-machine-scrubbing* is the practical solution to the floor-cleaning problem, any lesser, slower method is wasteful of money and manpower. A *Combination Scrubber-Vac* applies the cleanser, scrubs, flushes if required, and picks up (damp-dries the floor)—*all in one operation!* Maintenance men like the convenience of working with this single unit . . . the thoroughness with which it cleans . . . and the features that make the machine simple to operate. It's *self-propelled,* and has a *positive* clutch. There are no switches to set for *fast* or *slow* — slight pressure of the hand on clutch lever adjusts speed to desired rate. The powerful vac performs quietly. Cable reel is self-winding. *Model 213P Scrubber-Vac* shown at left, for heavy duty scrubbing of large-area floors, has a 26-inch brush spread. Cleans up to 8,750 sq. ft. per hour (and more in some cases), depending upon condition of the floors, congestion, et cetera.

Finnell makes *Scrubber-Vac Machines* in a full range of sizes—for small, vast, and intermediate operations. From this complete line, you can choose the size that's exactly right for *your* job (no need to *over-buy* or *under-buy*). It's also good to know that you can lease or purchase a *Scrubber-Vac,* and that *a Finnell Floor Specialist and Engineer is nearby* to help train your maintenance operators in the proper use of the machine...to recommend cleaning schedules for most effectual care . . . and to make periodic check-ups. For demonstration, consultation, or literature, phone or write nearest *Finnell Branch* or Finnell System, Inc., 5309 East Street, Elkhart, Indiana. Branch Offices in all principal cities of the United States and Canada.

FINNELL SYSTEM, INC.

Originators of Power Scrubbing and Polishing Machines

Everything FINNELL for Floor Care

BRANCHES IN ALL PRINCIPAL CITIES

For more facts circle 523 on Reply Card

PLANT ENGINEERS' DIGEST so those who rush may read and know what's new

Edited by Marjorie E. Weissman

Floating Die

AIR INJECTED at 100 psi through six evenly spaced, ⅛-in. holes, float a transfer plate and die on a cushion of air, enabling the operators to move the die under the press with "fingertip pressure."

Five pounds pressure is needed to move the plate and die once the air is turned on; without the pneumatic device, five men would be required.

Rollers were considered as a means for positioning the tool, but these would have had to be removed before the press could have been operated. Instead, the pneumatic device was designed and a one-fifth scale model built. Various injection orifice positions were tested until proper balance was acquired when an object was raised by the air pressure. The model lifted 1500 lb.

In use, the flanges on the side of the magnesium tooling plate, which is used as purchased without any machining, hold the plate in alignment with the press table. Accurate positioning of the die under the press may be achieved by installing automatic shut-off cams for the air supply, adjusted to stop the travel of the tooling plate at any point. *From a release of Northrop Aircraft, Inc., Hawthorne, Calif.*

Finger tip pressure moves die and table, supported by air, under press

Gold-Plated Turbine

UNDER EXPERIMENTAL conditions, a thin plating of gold helps to protect jet engine turbine blades from deteriorating at the high temperatures under which they must function.

Many turbine blades are made in part from molybdenum, a metal which corrodes at high temperatures and which burns rapidly at 1800 F.

The metal can be electroplated with nickel or chromium, both of which have good resistance to air at high

(Continued on page 40)

Conveyors for Logs, Anchored in Mid-River, Replace "Bridge" System Destroyed by Hurricane

FLOATING CONVEYOR system on the Kennebec River, at Winslow, Maine, is handling 200 cords of logs an hour during the log drive from June to November. The logs travel downstream from the Maine timberlands until they reach Winslow, where they are sorted according to the mill to which they are to go.

This was formerly done manually by crews of men working from three "bridges," 100 ft apart in the middle of the river, which were destroyed by Hurricane Edna in 1954. Working in three shifts, it required 90 men to sort 2000 cords a day.

The new conveyor system, set in the middle of the river, is moored fore and aft to concrete piers. Traveling at 120 fpm, the four-strand, bushed roller chain conveyor hauls 200 logs an hour from the river. The logs travel up an incline, then are discharged through a two-way chute onto belt feeders. From there, they travel over a live roll conveyor to a 60-in. wide flat roll sorting belt conveyor, where they are sorted manually.

The system is driven by a 50-hp, 1200-rpm, squirrel cage motor.

Fabricated by James Russell Engineering Works, Boston, Mass., the complete system was shipped by road to the river in 10-ft sections. After it was assembled and launched, various compartments were filled with water for ballast. *From Link-Belt News, published by Link-Belt Co., Chicago, Illinois.*

Aerial view of conveyor system in river for handling logs

River current sweeps logs onto haul-up conveyor (foreground)

Now—for maximum Roof Protection
Johns-Manville

Aquadam

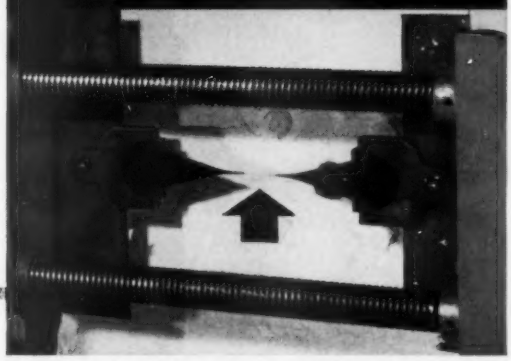
(slag or smooth surfaced)

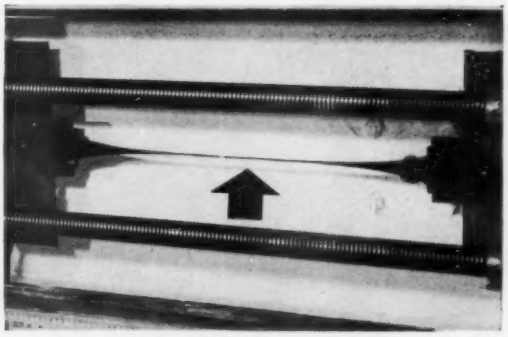
Built-Up Roofs*

Aquadam offers these important advantages:

- Superior resistance to cracking
- Superior weather resistance
- Improved self-healing properties
- Greater kettle stability
- Greater adhesion—stronger bond
- Greater resistance to water
- Excellent uniformity

Here's conclusive proof of Aquadam's greater resistance to cracking!





Top: a typical asphalt shown at average breaking point of 12 CM.

Bottom: Aquadam at a 25 CM stretch—100% beyond average—won't break even when stretched to 110 CM.

J-M Aquadam proved superior by actual test... helps provide longer roof life at no extra cost

Johns-Manville Aquadam is specifically designed to provide maximum built-up roof service for deck inclines from dead level to ½" per foot*.

J-M Aquadam Built-Up Roofs owe their proven superiority to the newly developed bituminous asphalt cementing agent Aquadam—which is used in the application of the roofing felts.

When applied, the excellent adhesive properties of Aquadam provide a permanent bond to the felts, and to gravel or slag surfacing. Its rigidly controlled quality and excellent flow properties assure easier mopping, thorough coverage, and longer lasting roof life.

Your local Approved J-M Contractor, listed in the classified telephone directory, has complete information about Aquadam Built-Up Roofs. Or write Johns-Manville, Box 158, New York 16, N. Y. In Canada, write 565 Lakeshore Rd. East, Port Credit, Ont.

JOHNS-MANVILLE JM PRODUCTS **Johns-Manville**

For more facts circle 524 on Reply Card

PLANT ENGINEERS' DIGEST

(Digest begins on page 38)

temperature. However, it was found that air could penetrate between the grains of nickel and chromium and still come into contact with the molybdenum, causing damage.

In an effort to prevent this damage, molybdenum specimens were plated with one coat of chromium, then with a thin layer of gold, followed by additional layers of chromium and nickel.

When these specimens were exposed to high temperatures, the gold formed a layer that effectively retained the molybdenum, allowing the nickel-chromium coating to protect the part.

The experimental work was part of a basic research program on high temperature properties of electroplates, conducted for the Navy Bureau of Aeronautics. *From Battelle News, published by Battelle Memorial Institute, Columbus, Ohio.*

Compound Cures Leaking Pipes

CYANIDE ZINC plating solution, leaking from numerous threaded pipe joints in the plating solution filtration system and pipes leading to the plating room at the Superior Manufacturing Co., Albert City, Iowa, posed a serious occupational hazard.

As the solution leaked, and then evaporated on the pipes, cyanide salts formed on much of the equipment, posing a constant threat to plant personnel. The deposits could have been fatal had they been ingested and skin contact could also have had serious results.

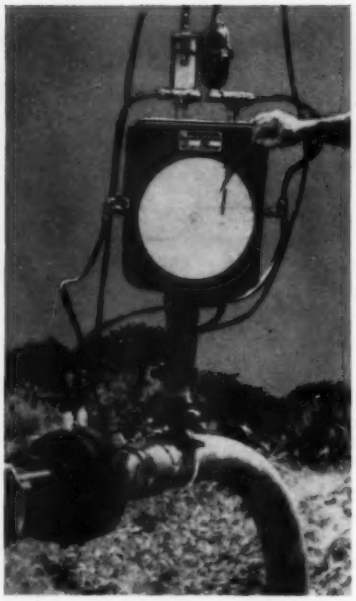
Every known kind of pipe-joint cement, including litharge and glycerine was used, but within a few days the plating solution would be oozing out through the threaded pipe joints.

About a year ago, a paste of semi-colloidal graphite dispersed in petroleum oil was brushed on the joints during assembly. After several months of continuous service, the pipes were still clean and there was no sign of leakage or disintegration. *From a release of Acheson Colloids Co., Port Huron, Mich.*

Predicting Water Demand

BY USING both orifice and water meters to double-check each other on a water well output line, the Water Department of Weimar, Texas, obtains accurate data on water consumption which helps in estimating water demand five years hence.

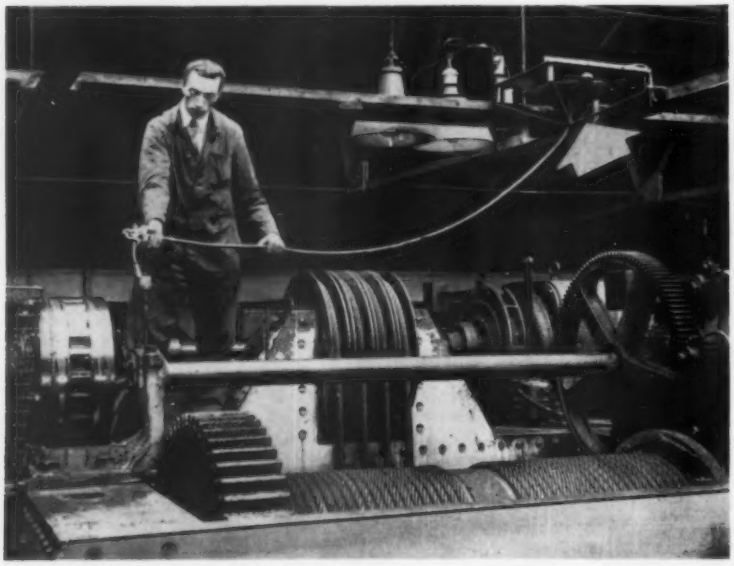
About a year ago, a 3-in. water meter was installed on the output line of Weimar's newest water well. While accurately indicating total flow, this meter does not furnish rates or time of flow. To obtain this information, an orifice meter and time recorder were installed on the line, just ahead of the water meter.



Orifice meter and time recorder installed in pipe line make it possible to predict water consumption years ahead

With the modified setup, the two meters can be used to check against each other as well as provide data on total flow, rate of flow, and time of pump operation. Since time records are now available, water rates may be calculated through simple division from readings on the water meter and compared with rates indicated by the orifice meter. *From a release of Rockwell Manufacturing Company, Pittsburgh, Pa.*

Overhead Stations for Servicing Cranes



Thirty-six stations for servicing 200 overhead cranes are used at English Steel Corp., Inc., Sheffield. Grease is supplied under pressure to reeling drums mounted on roof trusses (arrow). Each drum, capable of servicing 10 cranes, (shown with guards removed), holds 50 ft of hose which, rewinds automatically by means of spring-loaded coiling device. (From Target, published in London, England)

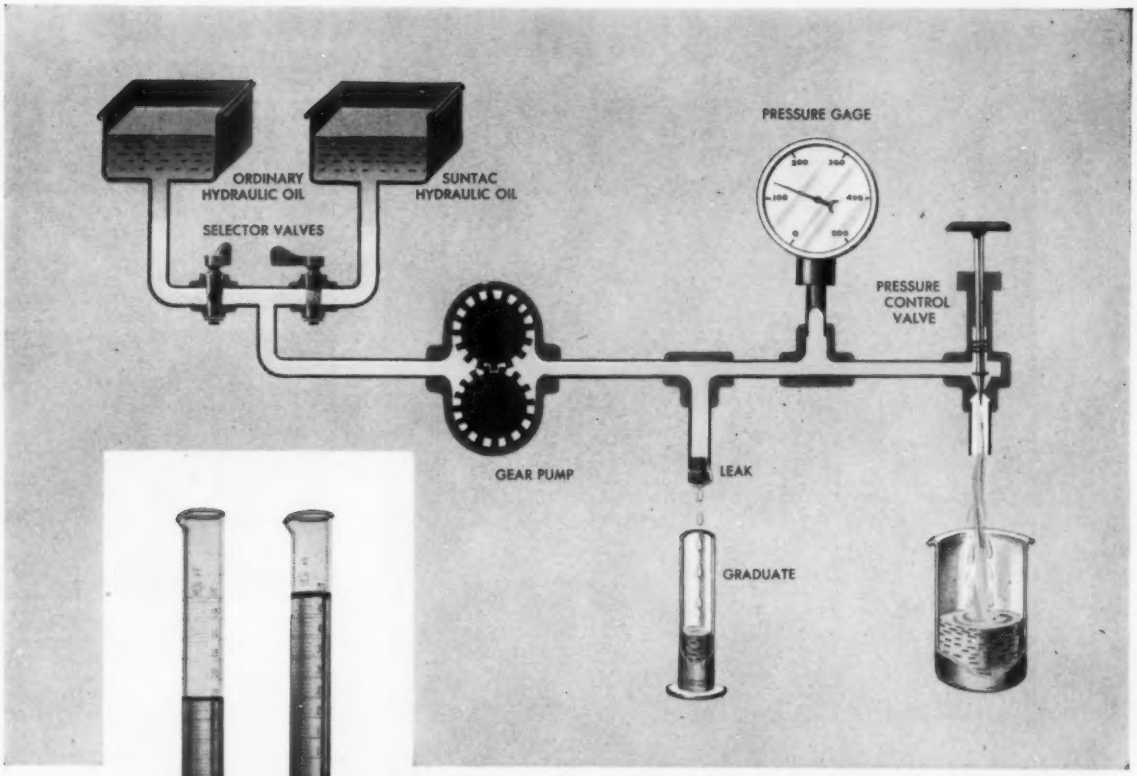
Epoxy Putty Salvages Castings

ACCOUNTING showed that ten per cent of delivered castings were being rejected after machining processes, costing the manufacturer from five to six dollars for each casting.

The defects were occurring predominantly in pump head wells into which a bronze bushing was inserted to support the pump shaft. There was no load, wear, or pressure on the area and it seemed that a repair procedure should be available to remedy the defects.

Depositing of weld metal and application of cold solder were both considered and then discarded; the former because it was too expensive and the latter because solders shrank in hardening and pulled out during subsequent machining.

An epoxy resin compound that cured



The leak rate of ordinary oil vs. Suntac was measured in test machine simulating a typical leak in a hydraulic system. Oil viscosities were equal, time and pressure conditions identical. The simple act of switching from the ordinary oil to Suntac, *without any other changes*, reduced oil leakage by 50%.

PRESSURE SYSTEM DESIGNED TO LEAK PROVES SUNTAC CUTS OIL LOSSES UP TO 50%

If you're having troubles with excessive oil leakage, a Suntac® oil can help you. Because of their unusual anti-leak characteristics, Suntac oils reduce oil consumption up to 90%, users report.

Suntac oils will not gum up or otherwise harm circulating systems. These oils are high-quality petroleum products with a life expectancy longer than that of ordinary hydraulic and circulating oils.

A change to a Suntac oil can lower your oil costs...improve housekeeping...result in safer working conditions.

Your Sun representative can tell you more about Suntac oils. Or write for Technical Bulletin 23. Address SUN OIL COMPANY, Philadelphia 3, Pa., Dept. PY-9.

SUNOCO

INDUSTRIAL PRODUCTS DEPARTMENT

SUN OIL COMPANY Philadelphia 3, Pa.

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IN CANADA: SUN OIL COMPANY LIMITED, TORONTO AND MONTREAL

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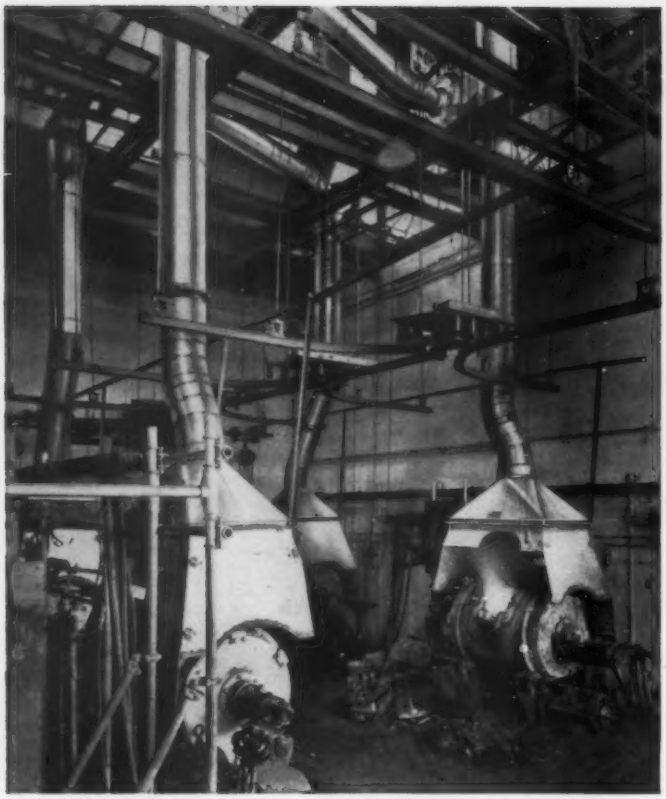


System ON

Operating Costs... Cut ½

FUME CONTROL SYSTEMS by KIRK & BLUM
at the William Powell Company, Cincinnati Valve Manufacturers

Twelve electric furnaces in the non-ferrous foundry of this noted valve manufacturer are individually exhausted by just six fans. Fan-driven exhaust from one hood is injected into a venturi in the piping from another hood.

System OFF

In metals melting operations, uncontrolled smoke, fumes and gases are a toxic nuisance. At the William Powell Company, "Clean Air . . . the Invisible Tool," as applied by KIRK & BLUM Engineers, controls this condition.

In addition, KIRK & BLUM Engineers, by utilizing the injector principle, reduced initial and operating costs, also halved maintenance—since each fan provides individual exhaust for two furnaces.

Although a "home-grown" system may be low in first cost, its savings fade when compared to the efficiency, lower maintenance and operating costs of a correctly designed, fabricated and installed system. Put your dust or fume problems up to experts.

For further details and illustrated booklet, write today to:

KIRK & BLUM
3189 FORRER STREET
CINCINNATI 9, OHIO

FUME CONTROL SYSTEMS

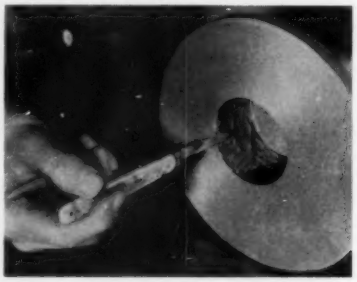
For more facts circle 526 on Reply Card

PLANT ENGINEERS' DIGEST

(Digest begins on page 38)

at room temperature, did not shrink, machined to a surface identical with the casting and was simple and easy to apply, filled the requirements for repairing the castings.

For use, the repair "putty" is mixed with the curing agent and applied to



Defective pump casting is patched with "putty" of epoxy resin and curing oil

the cleaned casting surface with a knife, spatula or similar tool. An excess is applied so that it can be machined to the correct dimensions.

The putty hardens by polymerization at room temperature and has a Rockwell hardness value of M-70; will withstand 14,400 psi; and a tensile strength of 5,600 psi. After curing, the casting is returned to the production line for machining. *From a release of Smooth-On Manufacturing Co., Jersey City, N. J.*

Hold It — On Radar

CATHODE RAY device that can stop the movement of a radar picture, has been developed by the aircraft industry for immediate application in airborne radar used to view meteorological phenomenon.

The five-inch, cathode-ray, direct viewing storage tube produces half tones and is sufficiently brilliant that it can be read in sunlight.

With the tube, a pilot sees a continuous picture on the radar screen rather than fleeting "blips" and he is able to control the time it takes for a picture to fade. A picture can be held brilliant for two or three minutes or erased at will. *From Planes, published by Aircraft Industries Association of America, Inc., Washington, D. C.*

Pin Remover

IN MAKING an electronic wiring assembly for electrical plugs used in the B-47 Stratojet airplane, it was necessary to remove the thin, gold-

CLEVELAND TRAMRAIL AUTOMATIC HANDLING SYSTEMS

Long Hauls • Heavy Loads
Big Man-Hour Savings

Robot materials handling systems are here

ROBOT materials handling systems are here. Cleveland Tramrail has a wide variety of them in use in many plants. Some operate inside, some outside; some between machines, departments, or building floors; some between distant plants (as illustrated above). Some carriers travel between two points; others serve as many as 126 stations.

Operators are not needed for robot carriers. Pressing a button sends a carrier on its way. At the delivery point it stops automatically. After unloading and reloading, pressing another button returns it to the original station or to some other station as selected.

Cleveland Tramrail automatic carrier systems are available for loads of 1000 lbs. to 10 tons. They will lift loads to heights of 100 feet, if necessary, and carry them for practically any distance. Some carriers even unload and return automatically.

The man-hour-saving possibilities that Cleveland Tramrail Automatic Handling Systems offer you are tremendous—and there are other important advantages. It will pay you to get acquainted with this rapidly spreading idea of materials handling.

GET THIS SPECIAL REPORT
Write us for your free copy of "AUTOMATIC DISPATCH PORTFOLIO" Gives data on a variety of cost-reducing automatic handling installations.

CLEVELAND TRAMRAIL DIVISION
THE CLEVELAND CRANE & ENGINEERING CO.
7510 EAST 290th STREET, WICKLIFFE, OHIO

CLEVELAND TRAMRAIL
OVERHEAD MATERIALS HANDLING EQUIPMENT

For more facts circle 527 on Reply Card

Why you get more service from V-Belts with CONCAVE SIDES

Fig. 1

Each sidewall of a Gates V-belt is concave (Fig. 1)—a precisely engineered curve that makes V-belts last far longer.

Fig. 1-A

HERE'S WHY: on the bend around the sheave, the concave sides of a Gates V-belt fill out and become straight (Fig. 1-A). Thus the belt makes full contact with the sides of the sheave, grips the sheave *evenly*. This even contact distributes wear uniformly across the sides of the belt.

Uniform wear lengthens belt life; keeps costs down.

MAKE THIS SIMPLE TEST

Fig. 2

Fig. 2-A

Bend a straight-sided belt (Fig. 2). The sides bulge at the bend causing uneven contact in the pulley groove (Fig. 2-A). Naturally, wear is greater at points indicated by arrows. Result: shorter belt life, increased belt costs.

To cut down-time and V-belt replacement costs, specify belts that grip evenly and wear longer. Specify Gates Vulco Rope—the V-belt with concave sides. There is a Gates distributor nearby who will quickly supply the belts you need. The Gates Rubber Co., Denver, Colorado—*World's Largest Maker of V-Belts.*

There are Gates Engineering Offices and Distributor Stocks in all industrial centers of the United States and Canada, and in 70 other countries throughout the world.

Gates

TPA 109

Gates VULCO ROPE Drives

For more facts circle 528 on Reply Card

PLANT ENGINEERS' DIGEST

(Digest begins on page 38)

plated terminal pin from the plug in order to solder wires in place.

The only tool available for removing the pins was a pair of needle nose pliers. Frequently, the pliers would

Special tool is slipped easily over pin

Sleeve removes gold pin, undamaged

slip during removal of the pins, and the pins would be ruined.

The problem was solved by making a small phenolic sleeve-type gripping tool which slips over the pin. By tightening with a set screw, the pin is removed without damage. *From Southern Star, published by Lockheed Aircraft Corp., Marietta, Ga.*

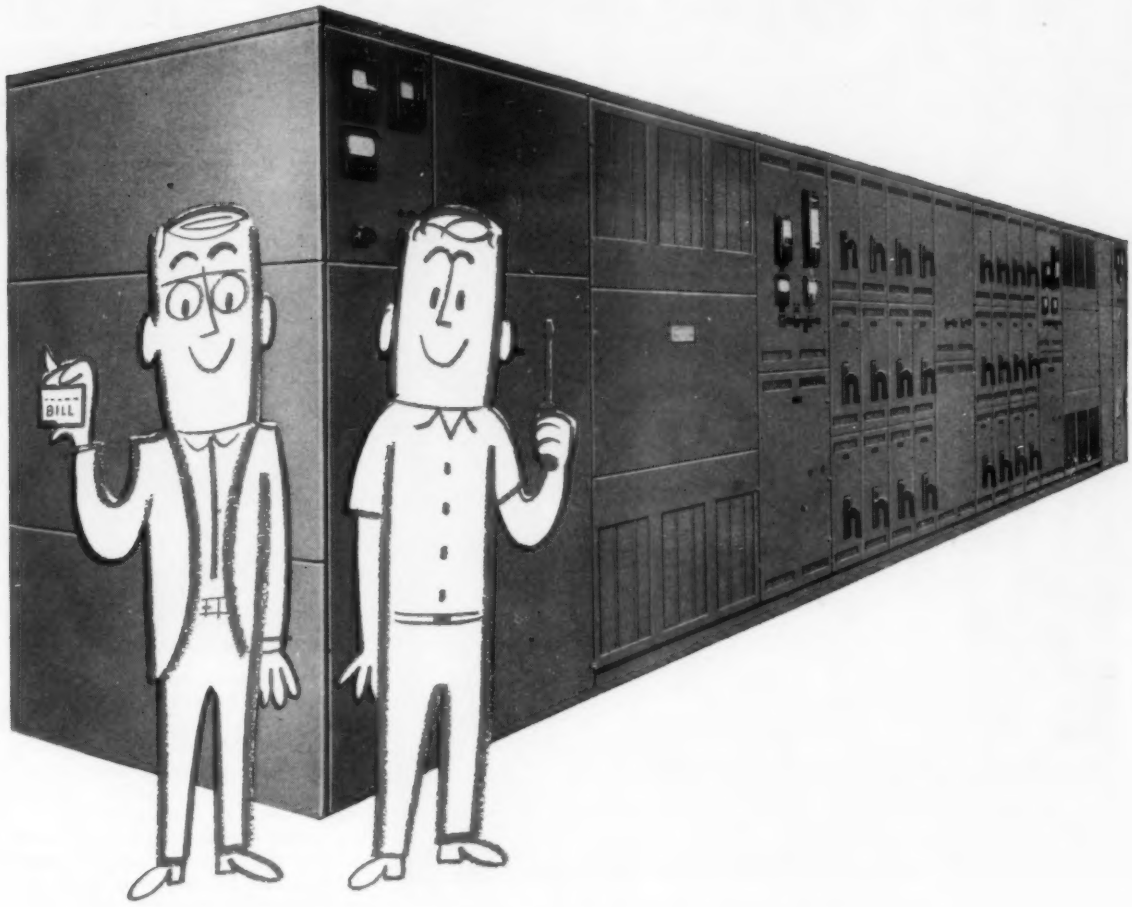
Spot-Cooled Plant

WHEN IT WAS apparent that various parts of the Observer newspaper plant in Charlotte, N. C. each presented a different air conditioning problem, spot cooling for actual working areas was chosen as the best method. This was done by dividing the plant into 10 zones.

Estimated daytime load was 134 tons; maximum night load, 150 tons.

A 150-ton hermetic centrifugal re-

I-T-E Secondary Unit Substations



. . . designed and built for economy in installation and operation

I-T-E Secondary Unit Substations bring electric power nearer to where you use it—make it more dependable—save you time and money.
They do it in several ways:

- By bringing higher voltages nearer the load and reducing power losses
- By reducing voltage drops inherent in long low-voltage runs and increasing machine efficiency
- By saving space—all necessary components are housed in one functionally designed unit
- By cutting delivery and installation time—units are assembled, tested and shipped ready for immediate installation from one source of supply
- By protecting plant personnel—all live parts are isolated and metal enclosed

I-T-E Secondary Unit Substations can be supplied for any application indoor or outdoor, and in any standard rating. For complete information, contact your nearest I-T-E sales office. Or write I-T-E Circuit Breaker Company, 19th & Hamilton Sts., Phila. 30, Pa.

I-T-E CIRCUIT BREAKER COMPANY • Switchgear Division

For more facts circle 529 on Reply Card

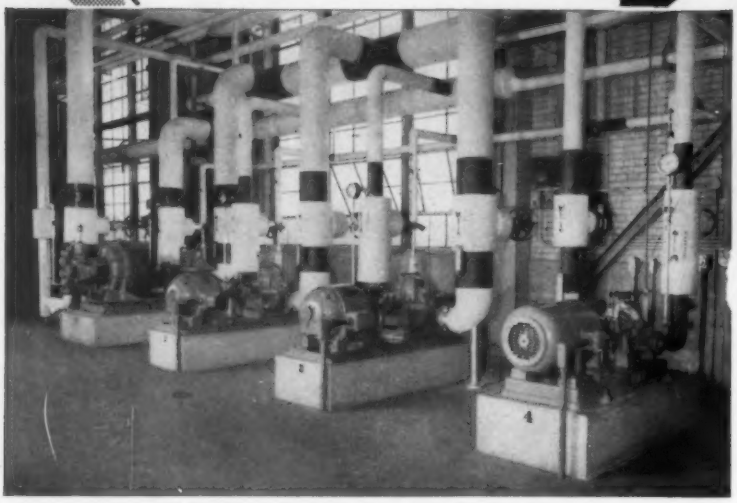
dependable

. . . or else!

Boiler Feed Pumps, like these four Warren Pumps shown at the new, ultra-modern North Grafton, Massachusetts, Heavy Press Forging plant of

WYMAN GORDON COMPANY

must always be available for round-the-clock operation—if and when necessary.



Photograph, courtesy Wyman Gordon Company. Other Warren Pumps in this plant include Condensate and Fuel Oil Transfer.

These experience-rated Warren Pumps, and thousands of others in the power plants of important and vital industries, are built with substantial plus factors as to dependability, low maintenance and economy.

BOILER FEED, CONDENSATE, FUEL OIL BURNER AND OIL TRANSFER SERVICE . . . there are types and sizes of Warren Pumps that will meet your requirements and live up to their reputation for dependability, minimum maintenance, economical operation and long life.

WARREN QUIMBY PUMPS

P-33

WARREN PUMPS

WARREN STEAM PUMP COMPANY, INC.

Warren, Massachusetts

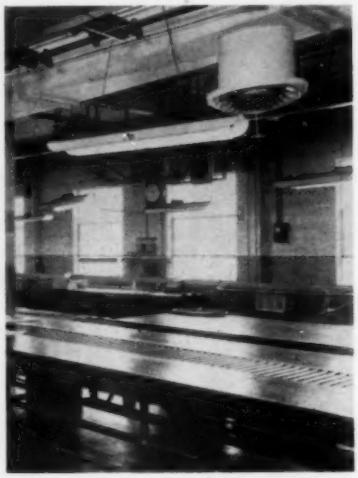
For more facts circle 530 on Reply Card

PLANT ENGINEERS' DIGEST

(Digest begins on page 38)

frigeration unit was used as a chilled water source. The unit cools a maximum of 360 gpm, from 55F to 45F and has automatic capacity control from 100 per cent to 10 per cent of capacity.

From a system of coolers planned around the refrigeration unit, air is



Diffuser (arrow) spots conditioned air over one of many work areas in plant

distributed through ducts to all conditioned zones except the business offices. These are handled by individual room air conditioners.

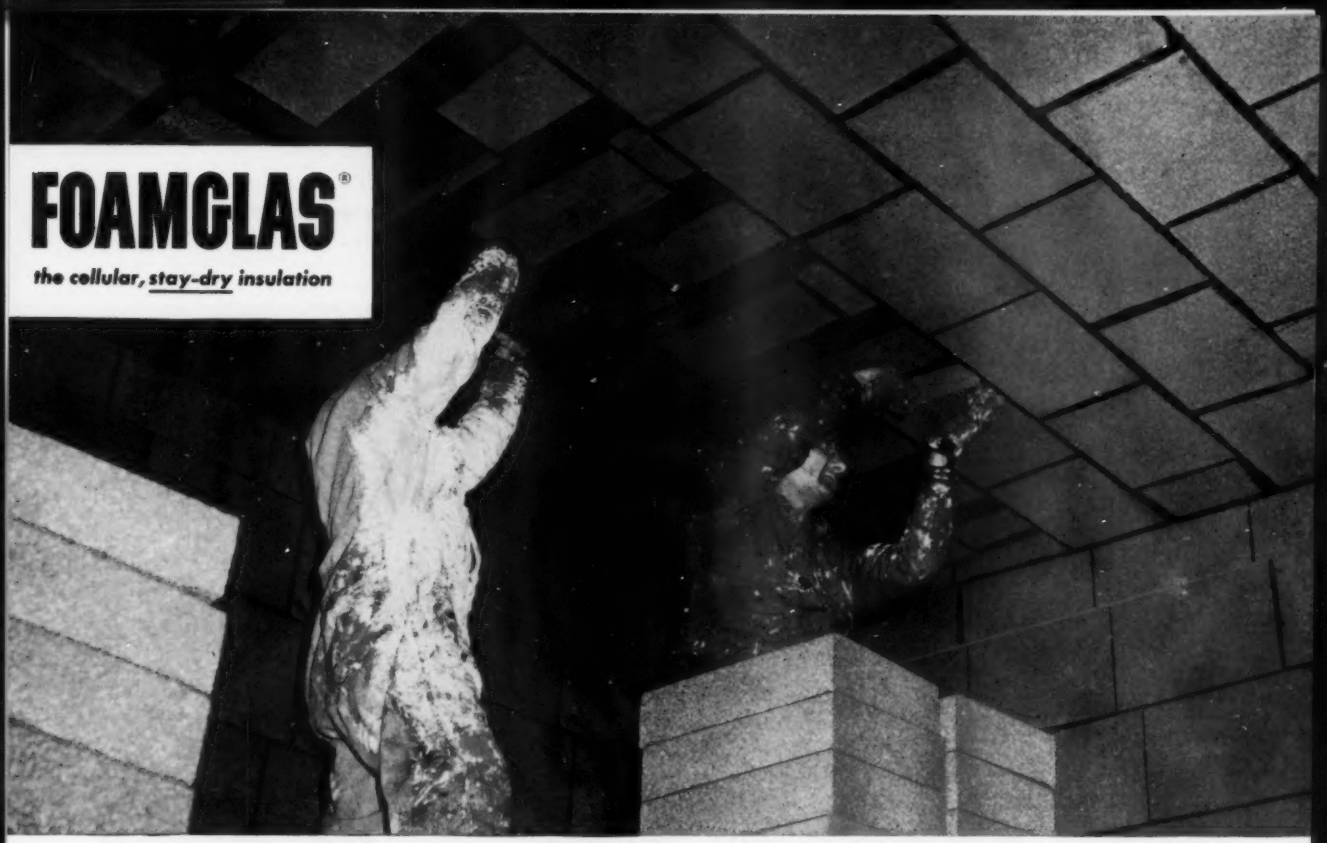
In the composing rooms, formerly one of the most uncomfortable areas in the plant, 23 linotype machines each have a pot of molten type metal, maintained at 525 F by an individual electric heater. Forty tons of air conditioning keeps these areas comfortable 24 hr a day. Units are installed next to outside walls, so that outside air is drawn directly through wall openings.

In the press room, which is 24 ft high, 28 ft wide and 100 ft long, total maximum cooling load was estimated to be between 150 tons and 175 tons. By spot cooling the operating side of the presses, 20 tons of air conditioning is needed. Air is distributed by means of a low duct. Since a large amount of ventilation is required, air is drawn directly from a wall opening.

In the stereotype department, where two furnaces are used for casting plates, a considerable amount of air must be constantly exhausted to eliminate fumes and heat. To do this without wasting cooled air, suction fans in an outside wall draw off most of the heat and fumes and breather pipes

FOAMGLAS®

the cellular, stay-dry insulation



Workmen are installing lightweight, dimensionally stable blocks of 4" FOAMGLAS in T-iron ceiling of new Welch Grape Juice freezer. Free-standing walls of FOAMGLAS—which help support the ceiling—require no extra structural support because of the insulation's unusual strength and rigidity.

Welch Grape Juice saves 10% on cold room construction by insulating with strong, stay-dry FOAMGLAS

The Welch Grape Juice Company found a new money-saving technique to build freezers and coolers at plants in Brocton and Westfield, N.Y. FOAMGLAS with its unique combination of structural strength and constant insulating effectiveness, made this new technique practical.

According to Welch: "We saved valuable time and at least 10% on construction costs with our new type of low temperature enclosure for freezing and storing grape juice concentrates. Key to the design was our use of FOAMGLAS as both structural wall and insulation."

Each of the new Welch cold rooms is surrounded by an insulating envelope of FOAMGLAS. It's used in all walls without support from building structural members . . . in free-standing partitions . . . in pan and T-iron ceilings . . . and under all wearing floors. Moisture-proof FOAMGLAS is dimensionally stable, rigid and takes compressive loads of seven tons per square foot without crushing. Thus, it enabled Welch to eliminate the cost of masonry back-up or supporting studs. And separate vapor barriers were unnecessary.

This completely inorganic cellular glass material provides virtually permanent insulating effectiveness, too. As Welch concludes, "Since FOAMGLAS is moisture-proof, its efficiency doesn't fade. That keeps down the load on our refrigeration equipment. Operating costs are held at a constant low level. In fact, our refrigerating requirements for these cold rooms should be no higher in ten years than they are today."

See for yourself how *you* can benefit when you insulate with FOAMGLAS. Send today for a free sample and directions for six easy tests to perform in your own office. You'll prove that FOAMGLAS is *your* ideal insulation! Write . . .

Pittsburgh Corning Corporation

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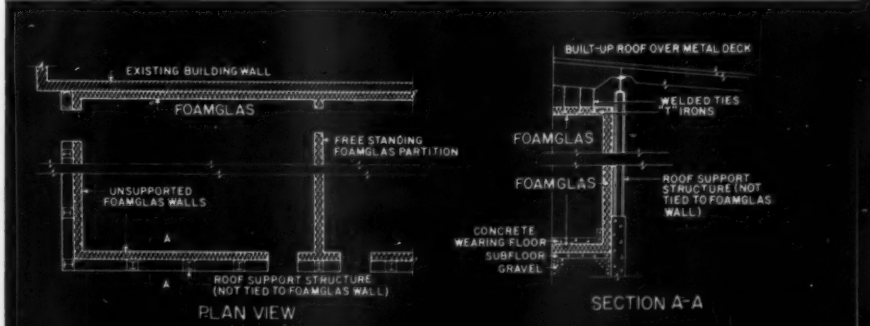
PITTSBURGH PC CORNING

Also manufacturers of PC Glass Blocks

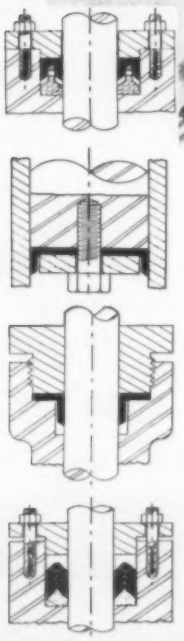


Detail showing use of FOAMGLAS in walls, free-standing partitions, ceiling and floor of new Welch Grape Juice freezer. Note section showing how FOAMGLAS stands free of structural supports for roof.

For more facts circle 531 on Reply Card

for honing and polishing

. . . you can't beat leather



. . and you can't beat Tannate Leather Packings for their inherent tendency to hone or "lap" in the metal parts upon which they work. Other packing materials operating under the same conditions have a tendency to score, yet Tannate Packings will not score or abrade the most highly finished surfaces.

Tannate Packings are precision molded and accurately finished for a most effective leak-proof seal. Tannate packings are job engineered from start to finish to meet your exact requirements.

If you design or maintain cylinders or presses send for Rhoads new Packing Hand Book now. Write J. E. RHOADS & SONS, 2100 W. 11th St., Wilmington 99, Del.

RHOADS

INDUSTRIAL LEATHERS

Wilmington New York Chicago Atlanta

For more facts circle 532 on Reply Card

PLANT ENGINEERS' DIGEST

(Digest begins on page 38)

pull outside air across the furnaces. Cool air, provided in this zone at night, is distributed by ducts from a unit which handles recirculated air only.

The basement reel room, which is directly underneath a concrete parking lot, is cooled in the evening only by 20 tons of air conditioning distributed by ducts.

Operating and maintenance costs are $2500 a year lower than estimated at the time of the installation three years ago. *From Weather Magic, published by The Trane Co., La Crosse, Wis.*

Protective Clothing for Hot Areas

FABRIC COATED with a thin layer of aluminum which reflects heat instead of insulating against it, makes it possible to fabricate clothing which allows a man to work in a temperature of 1200 F, one-eighth as hot as the sun.

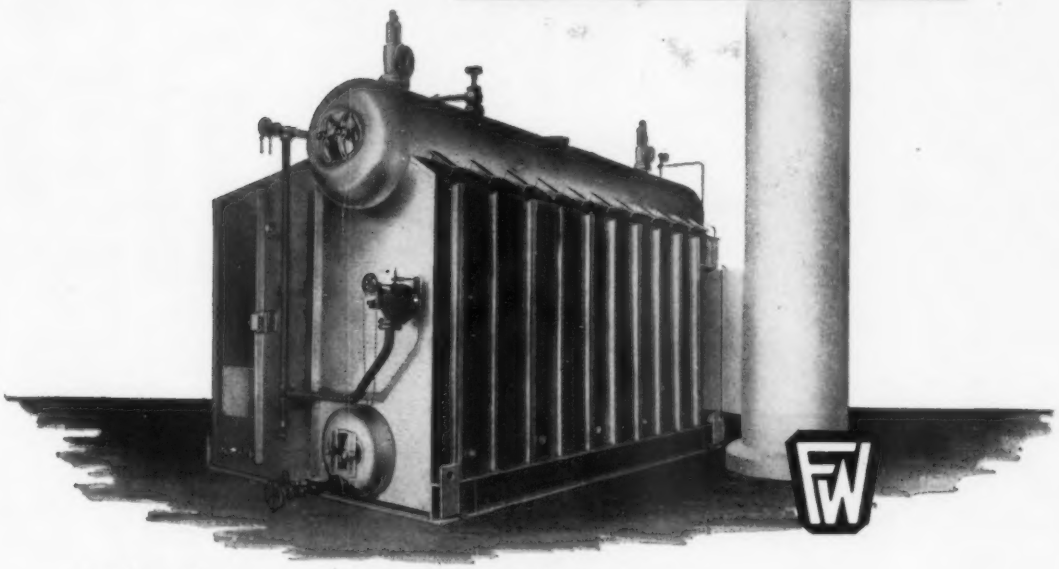
At a demonstration, an engineer wearing a suit made of aluminum-

Aluminum coated glass fiber fabric suit protects wearer by reflecting 1200F heat that makes wood burst into flame

coated glass fiber, backed with glass fiber quilting, entered a ceramic box furnace six times, each time remaining for two or three minutes. The temperature of the furnace was maintained at 1200 F. Steel wool, wood, and a fireman's rubber fire-fighting coat taken into the furnace caught fire, while the demonstrator was unaffected.

The coated fabric is being used for light weight smocks for steel workers and others working in hot areas. *From a release of Minneosta Mining and Manufacturing Co., St. Paul, Minn.*

CUT STEAM-PLANT INSTALLATION AND MAINTENANCE COSTS

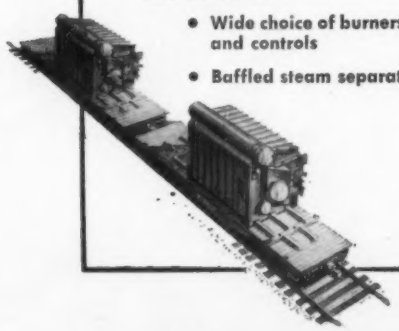


. . . with the NEW Foster Wheeler

PACKAGED STEAM GENERATOR

CONSTRUCTION FEATURES

- 36″ steam drum and 24″ water drum
- Staggered boiler tube arrangements
- Closely spaced waterwall tubes
- Water cooled target wall
- No headers—Low circulation loss
- Light, highly efficient refractory and insulation
- Wide choice of burners and controls
- Baffled steam separator



HERE IS a compact, space-saving steam generator that is completely factory assembled and shipped to you ready to set on a simple, low-cost foundation—ready for your fuel, steam and electric connections. There is only one outlet to the stack, and this has a simple, flanged connection as shown above. Extremely compact design permits access to boiler rooms through average building openings.

Low refractory maintenance is assured by the use of closely-spaced waterwall tubes and water-cooled target wall. The boiler interior is easily accessible for cleaning through a large access door in the rear furnace wall, and dusting ports are provided along the boiler bank side at intervals of not more than 42″. Soot blowers can be furnished as original equipment or installed later.

Available in capacities from 10,000 to 50,000 lb/hr, the *new* FW Packaged Steam Generator represents the last word in modern steam plant design. For complete details, send for Bulletin PG-55-3. *Foster Wheeler Corporation, 165 Broadway, New York 6, N.Y.*

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FORD ASSEMBLY PLANT
San Jose, California

Plant saves on 45 acres of overhead work with

UP-RIGHT
aluminum
SCAFFOLD-ON-WHEELS

17 FT. SCAFFOLD ASSEMBLED
IN 2 MINUTES BY 2 MEN

Faster, better, safer
work from
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You, too, can save with these rapidly assembled Up-Right aluminum scaffolds

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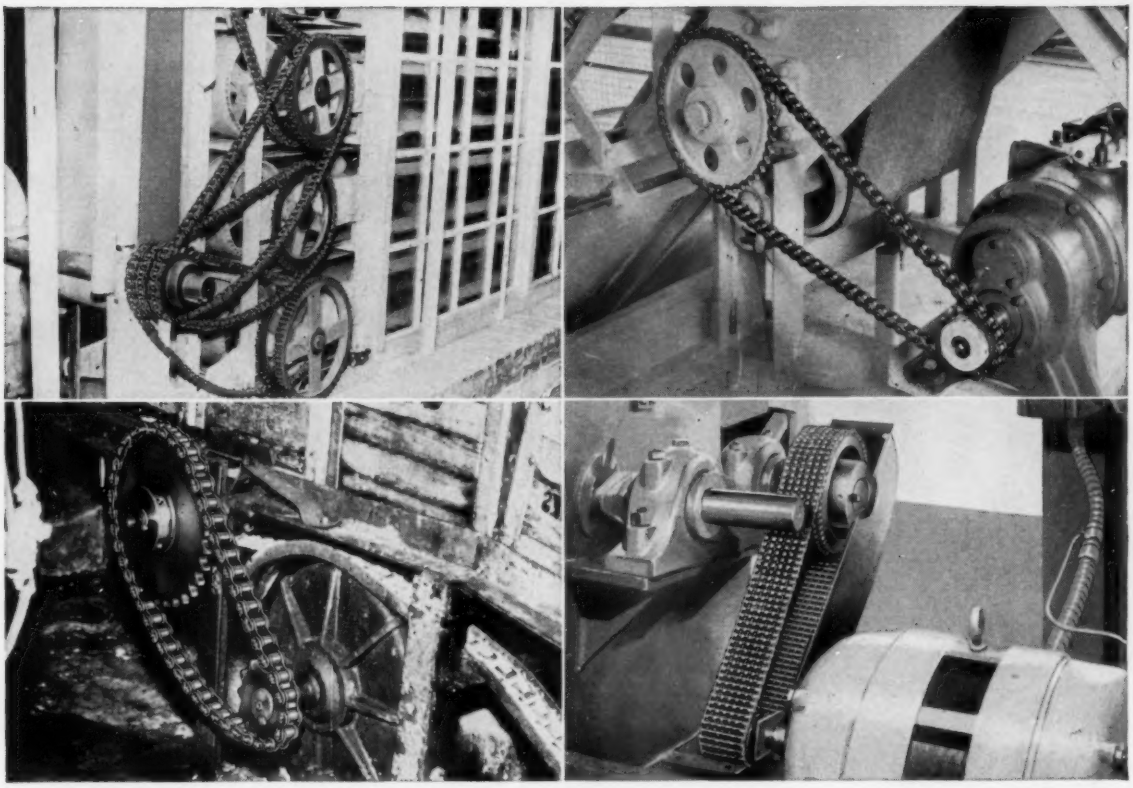

Help Improve Daily Plant Output
with Diamond Roller Chain Drives

For simple power transfer applications; drives of fractional, several hundred or thousand horsepower capacities; or for lifting, handling, processing, conveying — Diamond Roller Chains can help insure better performance and steady top output.

The smooth non-slipping operation, long-life dependability, reserve strength, and high maintained efficiency of Diamond Roller Chain are a result of over 65 years of effort devoted exclusively to this one product. You will find *uniform* quality in every part, every link, and every foot.

If you re-examine your production layout now, you will find many ways to adopt Diamond Roller Chain for improved performance and increased output.

DIAMOND CHAIN COMPANY, Inc.
Where High Quality is Traditional
Dept. 614, **402 Kentucky Ave., Indianapolis 7, Indiana**
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DIAMOND ROLLER CHAINS

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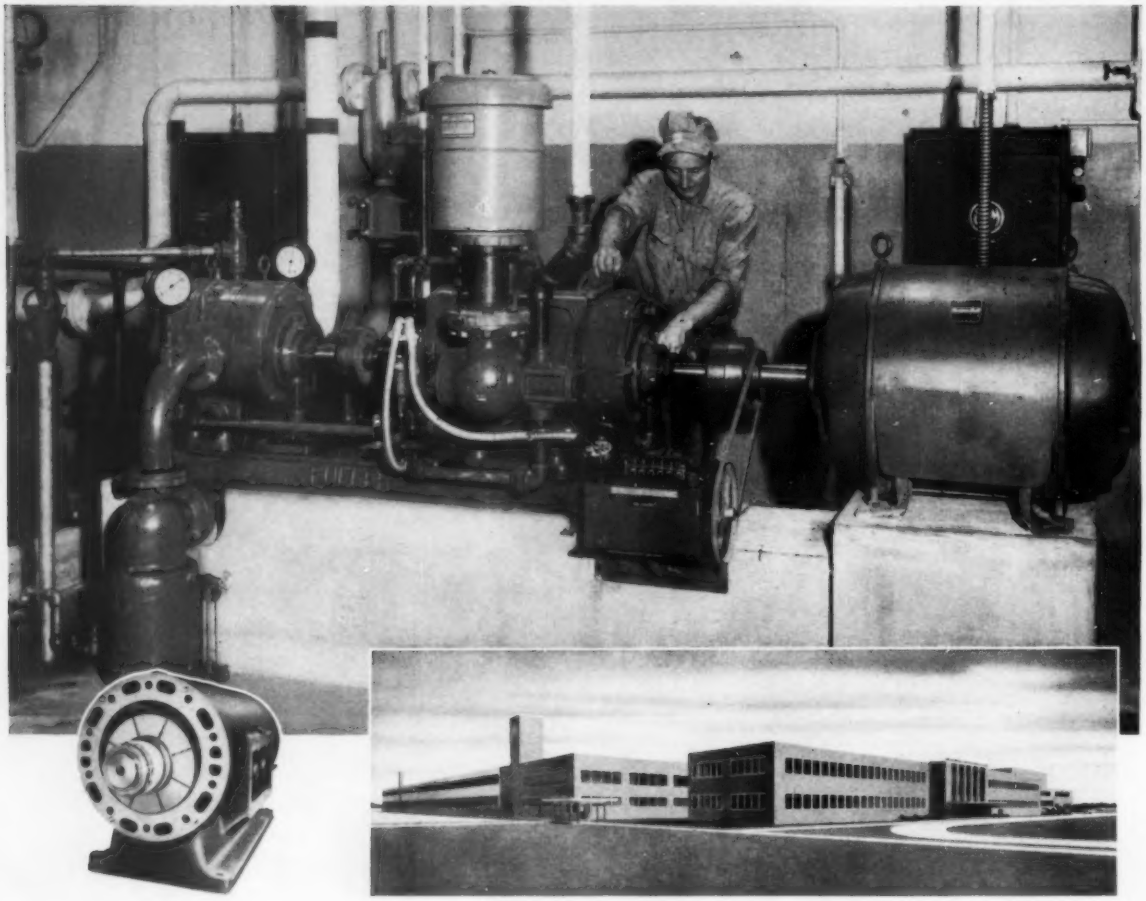

Modern, reliable air power for a modern, efficient plant

When Electric Controller & Manufacturing Company, Division of Square D Company, Cleveland, Ohio, designed and built its new four and one half million dollar plant, they had their sights set on economical production at high-level efficiency.

One of the items given serious consideration was the supply of compressed air, a considerable quantity of which is used throughout the plant. Fuller Company is justifiably proud to be associated with such a plant in being awarded the contract to furnish a Fullery Rotary Two-stage compressor as the main source of general plant air . . . a modern, efficient compressor for a modern, efficient plant. This machine has a capacity of 281 c.f.m., at 100-lb pressure.

Fuller Rotaries do a very big job no matter how tough the going. It's a job that, more and more, is being multiplied throughout all industry, these machines having gained wide acceptance as an efficient, reliable source of air power.

The key to Fuller's long life, and smoother operation, is *rotary motion*, which provides large capacity in relation to size, simple direct drive from motor or internal-combustion engine, minimum of working parts, air-flow free from pulsations, lack of vibration, continuous service with minimum supervision and maintenance. Installation in cramped quarters or on ordinary flooring is simple and practicable.

For a full description of Fuller Rotary Compressors and Vacuum Pumps, we would like to send you a copy of Bulletin C-5A. Write for your copy today.

FULLER COMPANY

138 Bridge St., Catasauqua, Pa.

SUBSIDIARY OF GENERAL AMERICAN TRANSPORTATION CORPORATION

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PIONEERS OF HIGH-EFFICIENCY VANE TYPE ROTARY COMPRESSORS SINCE 1930

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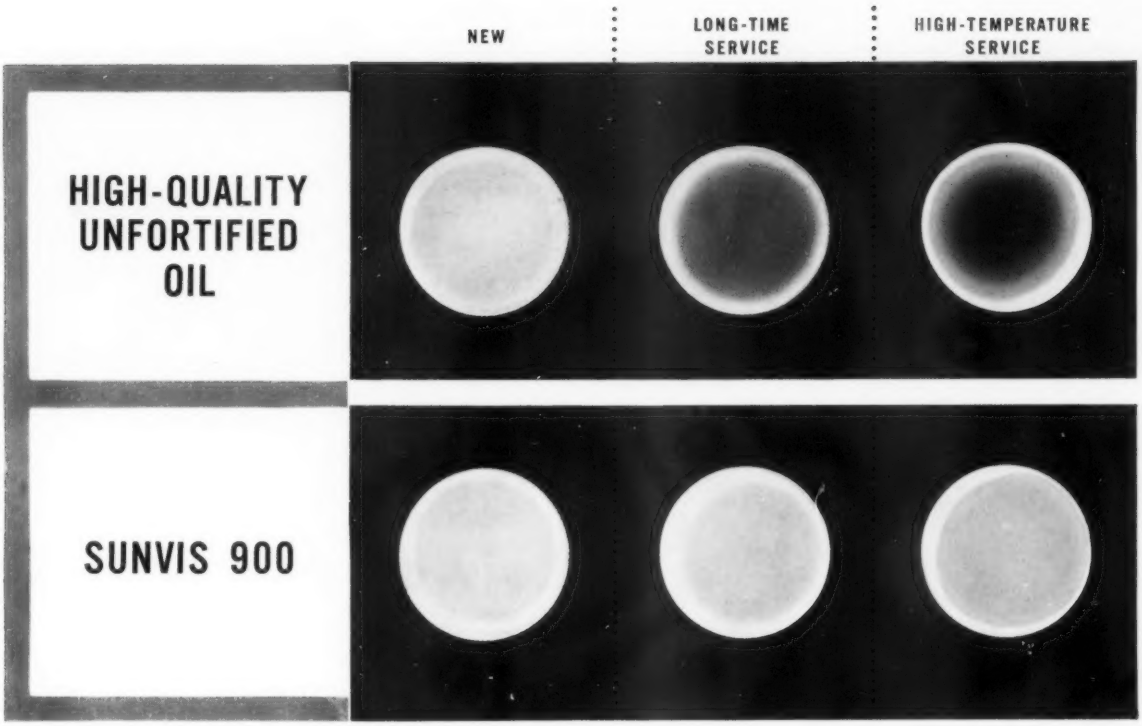

Oil color tests show

WHY SUNVIS 900 OILS SAVE YOU MONEY IN CIRCULATING AND HYDRAULIC SYSTEMS

Color means very little in brand new oils. But...color *change* during service can mean a lot. While minor darkening is seldom serious, radical color changes indicate danger, except, perhaps, in a highly detergent oil.

Either the oil is contaminated by foreign matter, or as in the pictures, the oil has oxidized from heat and long use. The products of oxidation darken the color of ordinary oils...clog valves and filters, cause excessive maintenance.

Compare the appearance of the used Sunvis 900 with the appearance of the other used oil. The color of used Sunvis 900 is practically the same as new Sunvis 900. There is not a sign of oxidation products.

Here's proof that Sunvis 900 oils will last longer and provide the extra needed resistance against the high temperature "hot-spots" of typical hydraulic and circulating systems. *For the long run, a Sunvis 900 oil is the most economical oil you can buy.*

For more information about Sunvis 900 oils, see your Sun representative, or write for Technical Bulletin 35. Address SUN OIL COMPANY, Philadelphia 3, Pa., Dept. I-31.

INDUSTRIAL PRODUCTS DEPARTMENT

SUN OIL COMPANY

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Philadelphia 3, Pa.

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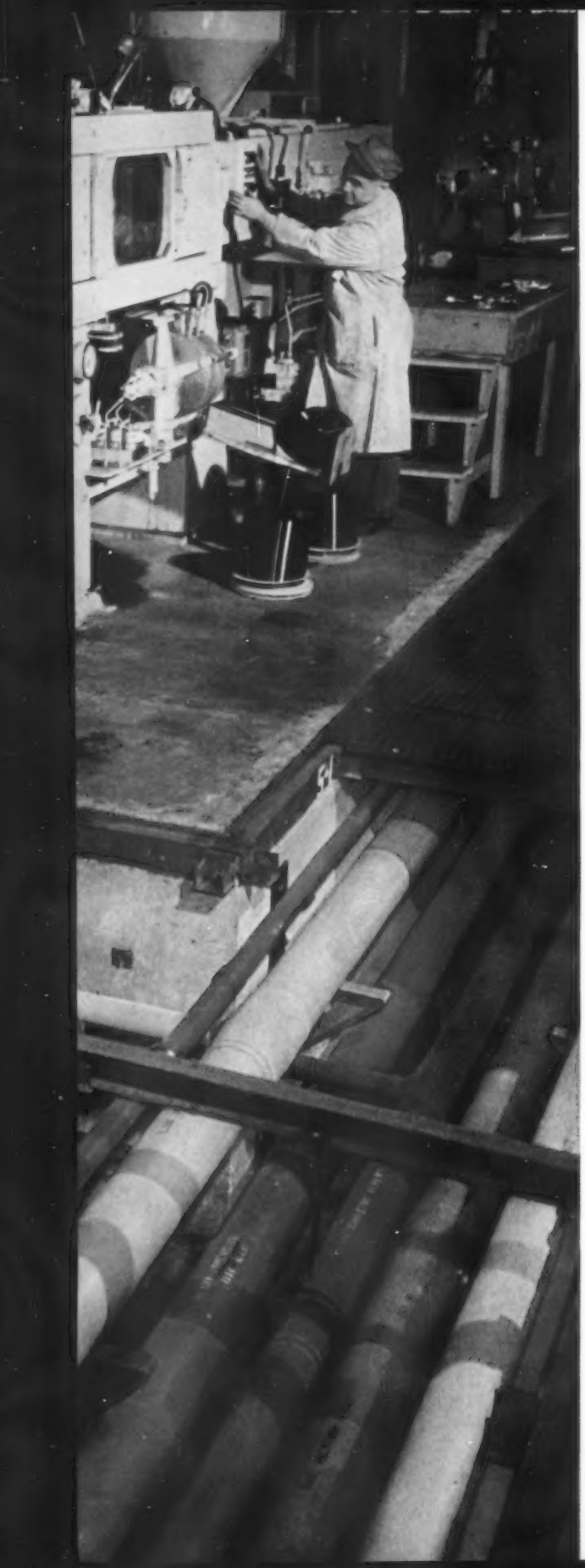
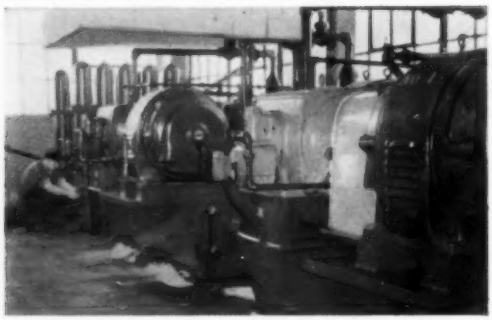


High-Pressure Pumps, below, each handle 54 gpm of Sunvis 931 at 2500 psi. Unique closed-loop hydraulic system, left, features color-coded piping.



NEW CENTRAL HYDRAULIC SYSTEM PROTECTED BY SUNVIS 931 OIL

The new variable-pressure hydraulic system at Columbia Records in Bridgeport, Conn., delivers oil at 2500 psi to as many as 40 injection molding machines. Round-the-clock production of micro-groove records depends on the reliability of this system.

Columbia picked Sunvis 931 because their tests and experience have shown it doesn't form carbon or leave harmful deposits...even after years of use. Because of their long life, Sunvis 900 oils are the least expensive oils you can buy for tight circulating systems.

This is just part of the story about Sunvis 900 oils. Why not talk them over with your Sun representative the next time he calls. Or write to SUN OIL COMPANY, Philadelphia 3, Pa., Dept. I-32.

SUNOCO®

INDUSTRIAL PRODUCTS DEPARTMENT

SUN OIL COMPANY

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In Canada: Sun Oil Company Limited, Toronto and Montreal

SELECT THE COIL THAT FITS YOUR UNIT-HEATER JOB BEST

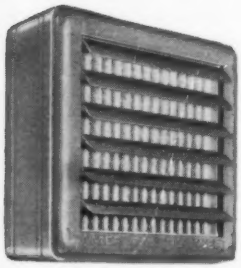
Not only is American Blower's line of Venturafin Unit Heaters complete in all popular sizes and capacities – but you also have a wide choice of coils to fit job requirements.

Both Venturafin Vertical and Horizontal Heaters offer coils for high temperature, high-pressure hot water, or interchangeable coils for steam or low-pressure hot water. An additional hot-water coil of serpentine construction is also available for horizontal heaters for low-pressure hot water.

All coils have high-quality nonferrous fins, mechanically bonded to seamless copper tubes – which, in turn, are brazed to headers. Steel tubes are available for high-temperature, high-pressure hot water.

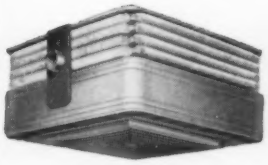
Select low-cost, quiet operating, easy-to-install American Blower Unit Heaters for *your* next job. For data, consult your nearest American Blower Branch Office.

Venturafin Unit Heaters for Steam and Hot Water



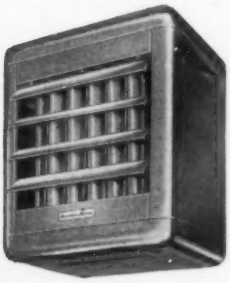
HORIZONTAL HEATERS

For horizontal blow, select from a wide range of capacities: 18,000 to 357,500 BTU at 2 lbs. steam pressure and 60° entering air.



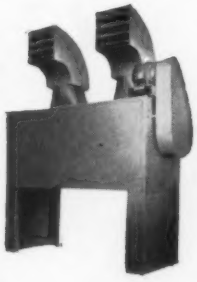
VERTICAL HEATERS

Equipped with exclusive ABC Equitemp Air Diffusers. Capacities: 58,400 to 560,000 BTU at 2 lbs. steam pressure and 60° entering air.



GAS-FIRED HEATERS

Available for natural, mixed, manufactured, LP, LP air gas mixtures, and dual fuel arrangements. Sizes and capacities to fit your needs.



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High-velocity type industrial space heating. Seven sizes. Capacities from 79,000 to 1,630,000 BTU per hour. Certified Ratings.

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- Mechanical Draft Equipment
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- Gyrol Fluid Drives
- Dust Collectors
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AMERICAN BLOWER

For more facts circle 538 on Reply Card

OPERATION AND PRODUCTION pointers for the industrial plant engineer

Edited by H. E. B. Anderson

Radiant Heat for the Salt Pile

WROUGHT IRON PIPE coils are being successfully used to "radiant dry" salt at the Jefferson Island Salt Co., Jefferson Island, La., where monthly salt production is 40,000 tons.

Basic problem in the salt warehouse was the accumulation of moisture due to the extremely high humidity in the area. At times, as much as one half inch of water covered the floor at the beginning of the day. This moisture, which caused much of the salt to set in a rock-like formation, was contributing to product loss.

Consultation with engineers of the A. M. Byers Co., Pittsburgh, Pa., led to the installation of coils of 1¼-in. pipe in a portion of the warehouse floor. On 18-in. centers, the lines were laid in a 26 by 70 ft section. A 3-in.-thick covering of concrete was poured over the coils.

High pressure steam, passed through a heat exchanger, provides water ranging in temperature from 140F to 180F, which is circulated through the wrought iron piping system. The result: a floor that radiates sufficient heat to evaporate the moisture precipitating from the saturated atmosphere. A portion of the drying system, beneath a 10 by 70 ft open loading area, dries this floor within 10 minutes after a rainfall.

According to E. P. Whitson, plant engineer at the salt company, the radiant dry system enables them to satisfactorily control humidity conditions in the salt storage areas.

Dust Haulers Are Self Dumping

PUTTING MOBILITY into its waste handling operation has saved time and cut expenses for the Manhattan Rubber Div. of Raybestos-Manhattan, Inc., Passaic, N. J.

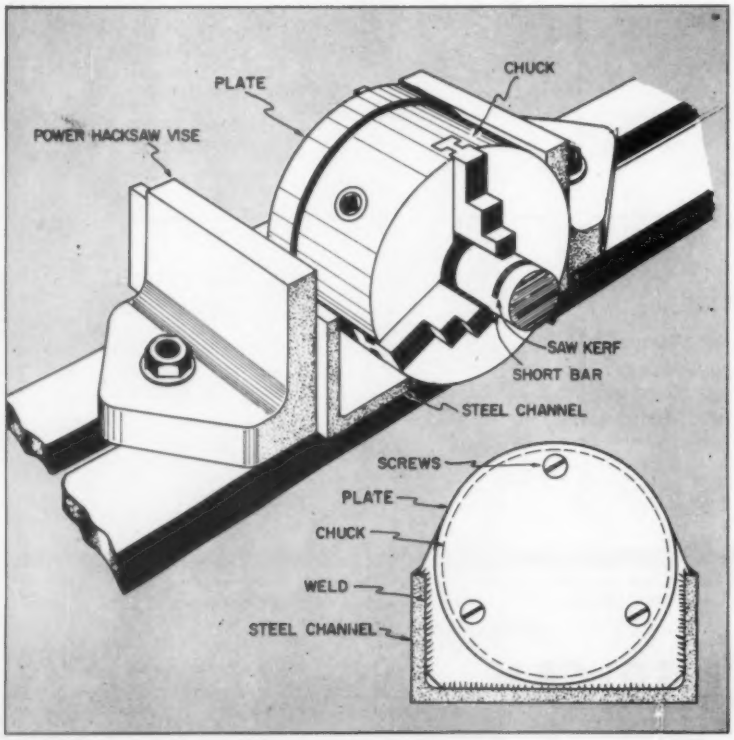
Dust from grinding operations on the company's rubber, asbestos and abrasive products is collected in filter-type dust collectors outside the plant. Bin discharge from these collectors drops the fine dust into two caster-mounted self-dumping Roura hoppers. Full hoppers are fork-trucked to a dump truck and lifted over the side for dumping. When a handle on the hopper is released, the hopper dumps itself and returns to its upright position. When empty, it is carried back

(Continued on page 58)

Operator dumps one dust collector bin into the hopper for disposal of fines

Chuck-Vise for Hacksaw Makes Practicable the Use of Short Lengths

Contributed by F. E. Riley



Gripping device holds short length of bar stock in position in hacksaw vise

SHORT ENDS of bar stock often accumulate in the stock rack because the ordinary vise on a power hacksaw is unable to hold them steady enough for an accurate saw cut. Many machinists use an excessively long piece of bar stock for machining a relatively short piece of work; in which case the excess material is usually machined away in the form of chips.

These short ends can be gripped in a vise constructed specially for the purpose, as illustrated. It consists of a self-centering chuck secured in a short length of structural channel. The channel has a vertical plate welded in its center, and the chuck is secured to this plate. Three drilled holes, which accommodate screws or bolts, remove the need for a machined register for the chuck on the plate. The channel section provides a rigid surface for the saw vise jaws to grip.

The usefulness of this device will be increased if two sets of jaws are available. As illustrated, the jaws will grip bars up to about 1½ in. in diameter; with a set of large-diameter jaws, work ranging in diameter up to the chuck body diameter can be gripped. With a 4-in. chuck, for example, blanks can be sawed from short ends of 4-in. bar stock, for use in making pipe flanges or similar parts.

Using

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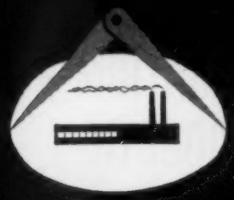


in Industry

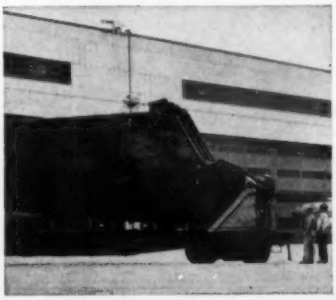
NEOPRENE-coated tarps answer dirt and weather problems for Boeing

Add the name of Boeing Aircraft Company to the growing list of companies that are using neoprene-coated tarpaulins to protect valuable cargo shipments against dirt, moisture and all kinds of weather.

Boeing protects its shipments of B-47 Stratojet bomber wings with neoprene-coated tarpaulins, which combine nylon's strength and light weight with neoprene's resistance to sun, weather, oil, flexing and aging. These tarps are lightweight and easy to handle. There's no problem of cracking or tearing. And they will not mildew, even if they are stored when wet.

They are the same tarpaulins that are being used so successfully by the trucking and marine industries. And they can be used just as effectively to protect products stored in open areas around many industrial plants.

If you have a shipment or storage problem involving equipment that needs protection, investigate neoprene-coated tarpaulins. And for information on many other money-saving applications of neoprene, clip and mail the coupon today.



FOUR B-47 STRATOJET bomber wings prepare for a rail journey, fully protected from weather and dirt by neoprene-coated nylon wing covers.

For more facts circle 539 on Reply Card

Acid-tank lining of HYPALON® requires no maintenance

Still handling pickling solutions after 18 months' continuous service

Foster Wheeler Corporation, a large industrial-equipment manufacturer, has solved a costly maintenance problem by lining its pickling-acid vat with HYPALON, Du Pont's new synthetic rubber. The previous tank lining in this 2,500-gallon vat lasted only a few months. The HYPALON lining has been in service for 18 months —with *no maintenance and no sign of deterioration.*

The pickling solution used in treating stainless-steel equipment is a mixture of 3% hydrofluoric and 15% nitric acid by volume. Service temperature varies between 40°F. and 100°F.

The vat is constructed of two-inch-thick wooden staves sealed with two coats of neoprene and a final lining of HYPALON. The total lining thickness is about six mils.

THIS 2,500-GALLON STORAGE VAT contains a mixture of 3% hydrofluoric acid and 15% nitric acid. Its lining of HYPALON has required no maintenance, and it shows no evidence of deterioration after 18 months' continuous service.

HYPALON also shows exceptional resistance to ozone and heat

In addition to its resistance to oxidizing acids, HYPALON has many other advantages that can help reduce your plant maintenance costs. It's completely resistant to ozone. Compared to other types of rubber, HYPALON also shows unusual resistance to hardening at elevated temperatures (250° to 350°F.). So whenever you face a maintenance problem involving deterioration of rubber by oxidizing chemicals, ozone or heat, investigate HYPALON. Ask your rubber-goods supplier about the HYPALON products he supplies, or clip and mail the coupon below.

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OPERATION — PRODUCTION

(O and P begins on page 56)

to the separator to be relocated under the bin discharge.

One of the hoppers is periodically hoisted to the second-floor boiler room to collect loose scale and old firebrick for disposal. Hoppers prevent spillage during handling to ground level, and are easier and faster to handle than were the wheelbarrows formerly used.

Communications System Puts Crane Operators on Schedule

HAND AND WHISTLE signals have been replaced by more modern means of communications between crane cab and floor workers at the Sheffield Steel division of Armco Steel Corp., in Kansas City, Mo.

The installation of a Telecrane FM carrier communication system has obsoleted other signal systems, providing clear oral communications without interference. The system was supplied by Mine Safety Appliances Co., Pittsburgh, Pa.

Three stations in crane cabs with a base station, a remote station in the soaking pit area, and a base station and a crane cab station in the blooming mill make up the initial installation. Each mobile or crane station consists of a loud speaker, an adjustable microphone, and a foot switch to close the microphone circuit.

The ground or base stations are compactly housed units, each having a microphone-speaker combination with a pull-down-to-talk switch.

The installations enable men in the pulpit station of the blooming mill to notify the crane operators when to draw an ingot from the soaking pits—an operation where correct timing is vital, to prevent delays that might permit the ingot to cool.

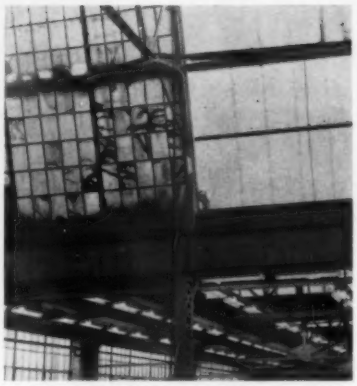
Amplifying the system's signals enables the foreman in the soaking pits to "listen in" on the conversations, with the result that he is aware of the crane movement orders as they are given.

No special wiring was necessary for the MSA communication system, since the FM carrier waves are transmitted over existing electrical circuits.

Translucent Panels for Lighter Plant

WHEN THEIR GLAZING reached the point where the glass panes had become discolored and cracked, the sash rusted and much of the putty missing, the Lehmann Machine Co., St. Louis, recognized theirs as a typical, though well-developed problem in industrial glazing.

They solved the problem by installing shatterproof Alsynite glass fiber panels, at less cost than reglazing the old sash. Admitting more light into the plant than the old glazing it replaced, the Alsynite has reduced the amount of artificial light required, and has eliminated much of the irritating glare in the plant.



Glazing at left is badly in need of replacement, as is shown at right

An in-progress photograph shows the comparison between the existing glazing at Lehmann and the new Alsynite panels after installation.

Plastic Bath for Acid Fumes

TEN-FOOT-HIGH polyethylene acid scrubbing towers have been fabricated for use by the Nyotex Chemical Co., Houston, Texas, to scrub chemically-contaminated air for recirculation. Reagents to be removed are hydrofluoric acid, hydrofluosilicic acid and sulfur dioxide gases, at temperatures of 100 F.

(Continued on page 60)

Colloidal Graphite Lubricant Lubricates Bucket Elevator Chain

COAL PARTICLES, dust and other grimy impurities coat the bucket elevator handling coal at the Whitehall Pharmacal Co., and ineffective lubrication was causing chain pin wear and corrosion of the elevator.

Among lubricants tried under the severe condition imposed in the application, colloidal graphite looked promising. Colloidal graphite dispersed in alcohol was tested, but the alcohol evaporated too quickly for the solid lubricant to reach the chain pins. Plant Engineer Harold S. Mahon tested a 10 per cent dispersion of graphite in mineral spirits, manufactured by Acheson Colloids Co. The mineral spirits carrier provided good wetting action and, though volatile, did not evaporate until after the particles of graphite were carried to all parts of the chain.

Chain pin wear has been lowered almost to the vanishing point, resulting in markedly increased working life of the conveyor chain.

Application is simple. Plant procedure calls for a dilution of one part 'dag' dispersion with seven parts of mineral spirits—a combination that is easily hand-mixed. It is applied every two weeks with a standard paint-spray gun to the moving conveyor chain, so that no downtime is required for lubrication. The compressed air blast not only lubricates the chain but at the same time blows out the accumulated dirt and coal dust.

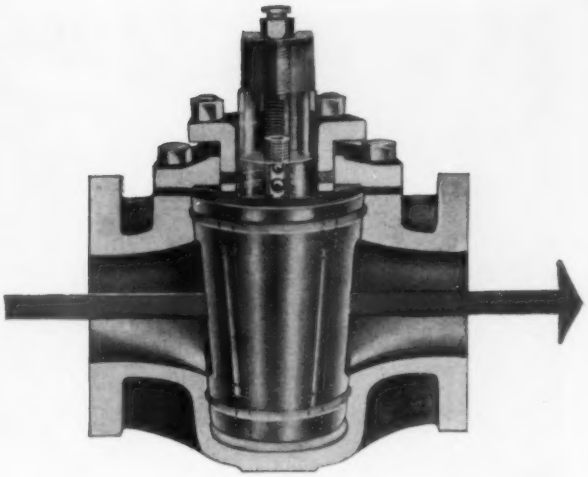
Fig. 1. Bucket elevator is easily lubricated through bottom inspection plate

Fig. 2. Spray gun is used to blow graphite dispersion on elevator chain

Straightway

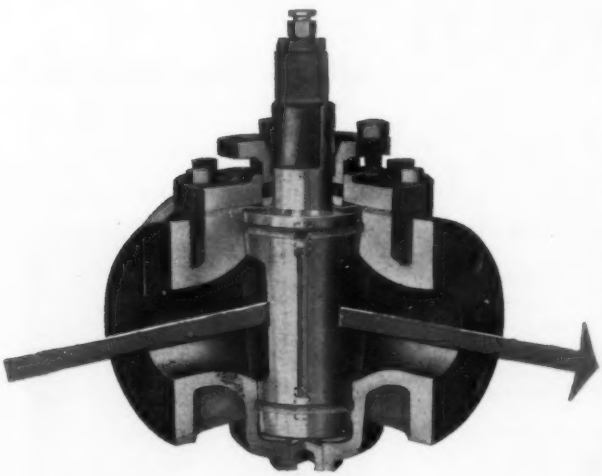
Leakproof Rockwell-Nordstrom Straightway valves cost you no more to buy and far less to use than any other valve. The exclusive Sealdport* lubrication system saves you important dollars in maintenance by eliminating the metal-to-metal friction that wears out other valves so quickly. Expensive seating problems are eliminated on even the toughest service because the Rockwell-Nordstrom valve seats are never *exposed* to the line fluid. Available in a complete range of sizes and pressure ratings in steel, semi-steel, stainless and other corrosion resisting metals.

*Registered trade mark, Rockwell Manufacturing Co.



Two ways to
Cut Your Valve Costs

ROCKWELL-Nordstrom Straightway and Multiport **VALVES**



Multiport

For such services as tank switching, relief, and blending, Rockwell-Nordstrom Multiport valves stop or change flow on three or four lines. You not only get perfect flow control but you save the cost of three or four ordinary valves . . . piping arrangements are simpler and less costly, too. Lubrication and unexposed seating assure lowest maintenance—longest service, just as in the Straightway pattern above. Rockwell-Nordstrom Multiport valves are available in semi-steel, steel, stainless and corrosion resisting metal in a wide range of pressure ratings and sizes to 16″. Rockwell Manufacturing Company, Pittsburgh 8, Pa. *Canadian Valve Licensee:* Peacock Brothers Limited.

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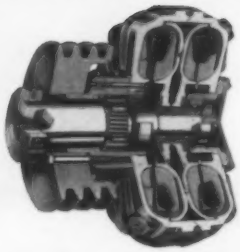

Convert to FLUID drive in only *5 MINUTES!*

Fluid drive in a package . . . complete, ready-to-install . . . slips right over the motor shaft, easily in a matter of minutes. That's the Twin Disc HYDRO-SHEAVE® Drive—compiling new records for high production and low equipment maintenance.

Here's what the HYDRO-SHEAVE does

1. Reduces starting current demands . . . provides smooth, fast motor acceleration.
2. Protects against motor overloads, stalling and burn-outs.
3. Transmits full motor torque at all speeds.
4. Cushions out destructive vibrations and shocks, protecting both driving and driven equipment.
5. Permits motor selection based on running load rather than starting load.

Twin Disc Fluid Drives are available as HYDRO-SHEAVE Drives, from ¾ to 50 hp; Fluid Couplings from ¾ to 850 hp; and HYDRO-WYND® Drives, Models 8.4 and 12.2 for winding and tensioning.

Write today for full details on these profitable fluid drives. See how easily they will solve your power transmission problems. Request Bulletins 144-D and 145-C, from Dept. DS, Racine, Wisconsin.

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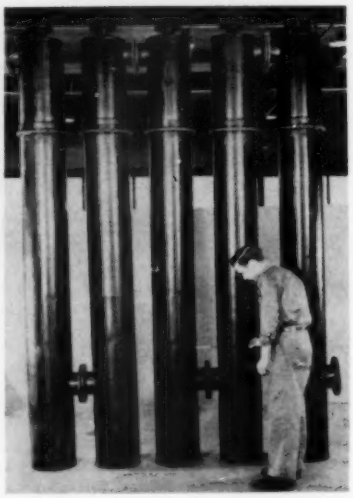
OPERATION—PRODUCTION

(O and P begins on page 56)



Battery of polyethylene scrubbers for scrubbing acid-fume contaminated air

As used by Nyotex, the towers receive fumes from chemical reactions, scrub them to remove the acids, and vent clean air to the atmosphere.

The towers, fabricated by the American Agile Corp., are made from seamless centrifugally cast tubing; they measure 12½ in. in diameter.

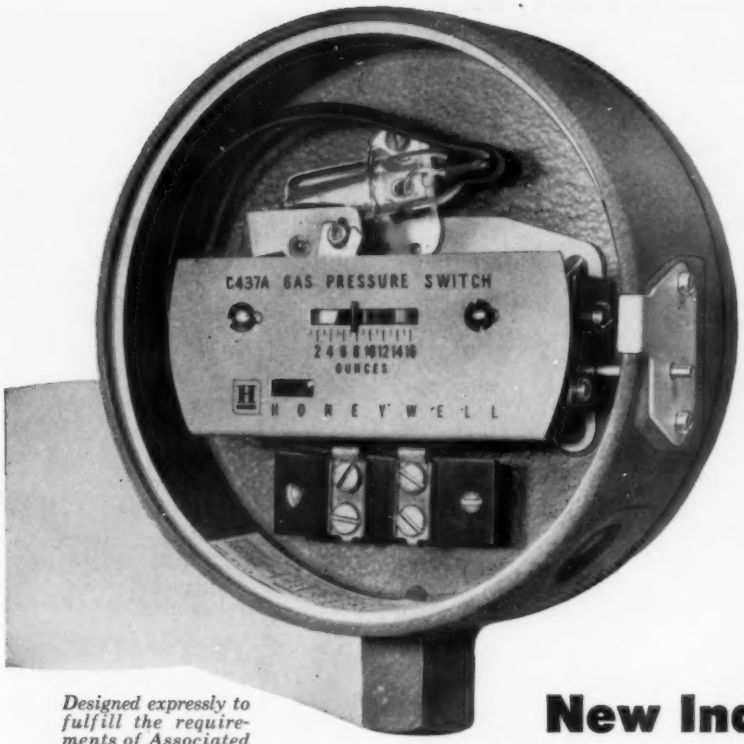
Controlled Squeeze Saves Hands

ACCIDENT-PROOF operation is a feature of an air-operated universal bag holder in use at Donovan's Feed Mill, Albert Lea, Minn. The operator can place his hand between the bag holder

Operator demonstrates safety feature of a clamp used to hold bags to spout

and bagging spout of an automatic bagging scale, manufactured by Richardson Scale Co., with no chance of injury.

The pneumatic mechanism that



Designed expressly to fulfill the requirements of Associated Factory Mutual and Underwriters' Laboratories.

New Industrial Gas Pressure Switch offers 4 exclusive safety features

USE this new Honeywell C437A Industrial Pressure Switch as a safety cutoff on multiple burner gas installations . . . as a pressure controller for hazardous gases . . . or as a differential controller for air or non-hazardous gases. It's simply designed, yet provides complete protection.

The C437A Industrial Gas Pressure Switch has these exclusive safety features:

1. Sealed Pressure Chamber—Should the diaphragm rupture from over pressure or any other cause, gas can't escape into the switch compartment or to the atmosphere. The pressure chamber is fitted with a pipe tap to permit venting to the stack.

2. Protected Settings—All adjustments are inside the case for protection against careless or accidental manipulation. A metal plate on the side of the case must be removed before changes in adjustment can be made.

3. Ever-Visible Switch Position and Control Settings—The entire cover of the pressure switch is a window. Position of the mercury switch and adjustment of the control settings can be determined at a glance.

4. Lockout Mechanism—An optional safety feature, when manual resetting is desired. The lockout mechanism prevents the switch from remaking contact after pressure has once dropped below the setpoint . . . even though pressure returns to normal. The lockout release button is the only adjustment that can be manipulated without removal of the protecting metal plate.

For complete information, call the nearest Honeywell office. A Honeywell sales engineer is as near as your phone.

MINNEAPOLIS-HONEYWELL REGULATOR CO., *Industrial Division*, Wayne and Windrim Avenues, Philadelphia 44, Pa.—in Canada, Toronto 17, Ontario.

● **REFERENCE DATA:**
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Spiratube is ideal for portable and semi-permanent applications. Sections can be linked together or detached in a matter of seconds without the use of tools. If machine changes are made, Spiratube can be assembled and disassembled and reused over and over again.

Spiratube is available in sizes from 3" to 30" in a variety of covers. Investigate this low-cost method of air or dust handling today. Stocks are available from leading distributors across the country. For further application information about this product, please send coupon below.

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Please send me illustrated catalog and more information on Spiratube.

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OPERATION — PRODUCTION

(O and P begins on page 56)

closes the bag clamps around the spout is designed to apply high pressure only during the last 1/16 in. of the clamps' travel. In this way, all danger of an operator's hand being hurt in the mechanism is eliminated.

Operation of the bag holder is controlled by a foot valve and an air control unit. The foot valve controls the opening and closing of the bag holder, leaving the operator's hands free to attach and remove bags—increasing filling speeds and bagging rates.

Broach Cuts Spiral Grooves

CUTTING OIL GROOVES in connecting rod bushings has been reduced to a four-minute operation, at the Long Beach Naval Shipyard, with the development of a spiral broach by John Nodson and John Sundstrom, of the Shipyard crew.

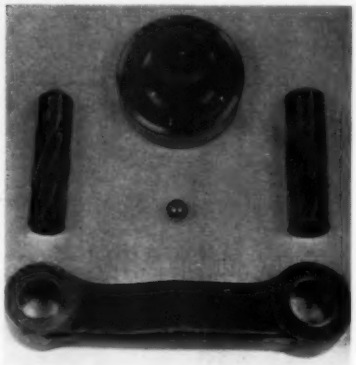


Fig. 1. Parts used in cutting the spiral oil grooves in connecting rod bushings

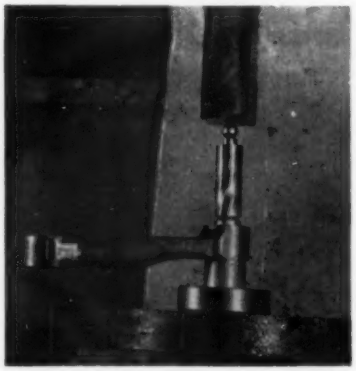
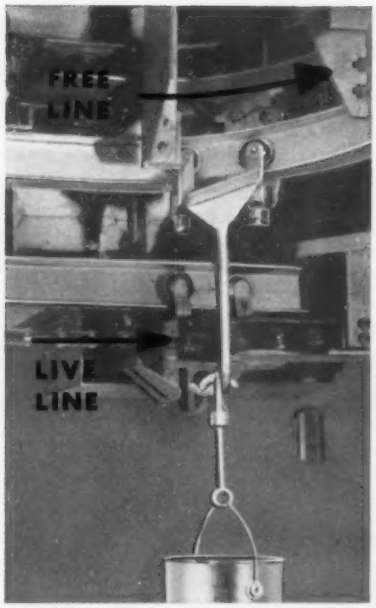


Fig. 2. Parts set in arbor press prior to grooving cut. Ball permits easy turning

The bushings are part of the hub assembly of controllable pitch propel-



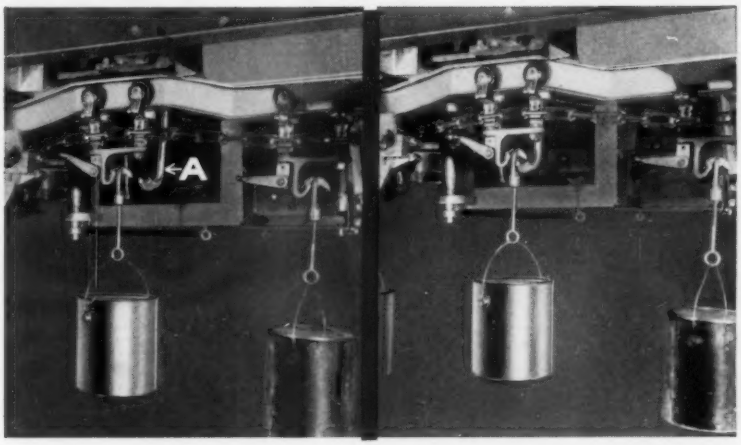
How TRANS-FREE provides trouble-free transfer from live line to free

Allied Conveyors' New Mechanical System has Complete Automatic Dispatching

Allied Conveyors' new Trans-Free system can now bring to new and old conveyor systems alike, automatic, trouble-free transfer from live line to free. Trans-Free is a completely mechanical system that can automatically dispatch loads to an almost infinite number of stations. It operates entirely without electrical switches, air cylinders, etc. You'll find it less costly to install originally. You'll find it will operate with virtually no maintenance expense.

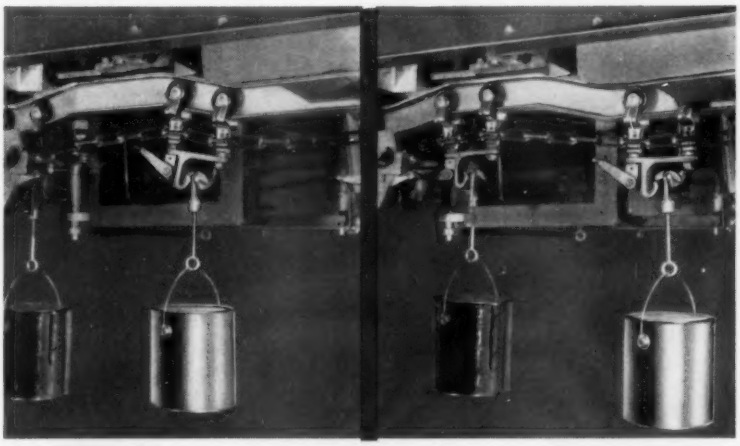
SEE TRANS-FREE IN ACTION!

The next time you're in Detroit, be sure to call Allied for a date to see Trans-Free in action. OR—write today for a complete illustrated booklet showing the many advantages of Trans-Free.



1 Indicated for transfer at this point, the load automatically triggers the transfer hook (A) swinging it into position. Transfer hook on free line travels at same speed as main line for perfect synchronization.

2 Load is powered along main system to engage transfer hook. Note the simplicity of the transfer. Entire transfer is completed mechanically without air cylinders, solenoid switches, etc.



3 As track dips to original level, load hook and transfer hook are both engaged, giving positive control throughout transfer. Incoming and outgoing loads are coordinated to prevent collision.

4 Transfer is completed as trolley reaches original level. Load now moves onto auxiliary line (which may be powered or free, as user prefers) for intermediate operations or storage.

56-2

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You can set both ¼" and ⅜" diameter studs with the Remington Stud Driver—up to 6 studs per minute either size. There are 40 different styles and lengths of Remington Studs to choose from. With this *one* tool, you can take on *every* stud-fastening job—light, medium and heavy-duty—and save time and money on every one of them! Get full details by mailing coupon below.

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*City*_____ *State*_____

For more facts circle 545 on Reply Card

OPERATION — PRODUCTION

(O and P begins on page 56)

lers for naval vessels. Previously, each of nine oil grooves was cut separately on a milling machine, requiring 50 minutes of machine time.

A hand-operated arbor press is now used to force a broach into the bushing to cut the grooves. A steel ball and a ball bearing are the "ingredients" used to obtain spiral action necessary for the broach to move through the bushing.

New Job for Guard Rail

Photo: Armco Drainage & Metal Products, Inc.

To retain stacks of pulp wood, Finch, Pruyn & Co., Glens Falls, N. Y., fastened 850 linear feet of Flex-Beam guard rail to uprights along pile face

Cooling Tower Cuts Water Bill by 9/10ths

WITH THE installation of a cooling tower, the Firth-Loach Metals Co., Pittsburgh, Pa., cut down on cooling water bills for their furnaces so radically that the local water company asked to check their own water meters.

Water requirements for Firth-Loach's cemented carbide manufacturing include cooling water for hydrogen and vacuum sintering furnaces, high frequency coils, vacuum pumps, an x-ray machine transformer, a high frequency converter and the aftercooler on an air compressor.

Maintenance Superintendent C. S. Miller of Firth-Loach determined that a cooling tower would be a vital link in recirculating and cooling the water to prevent its being wasted.

Water bills at the plant are now 1/10th the amount they were prior to the installation of the cooling tower, a Halstead & Mitchell CT-2500. And, since the company is now using 50

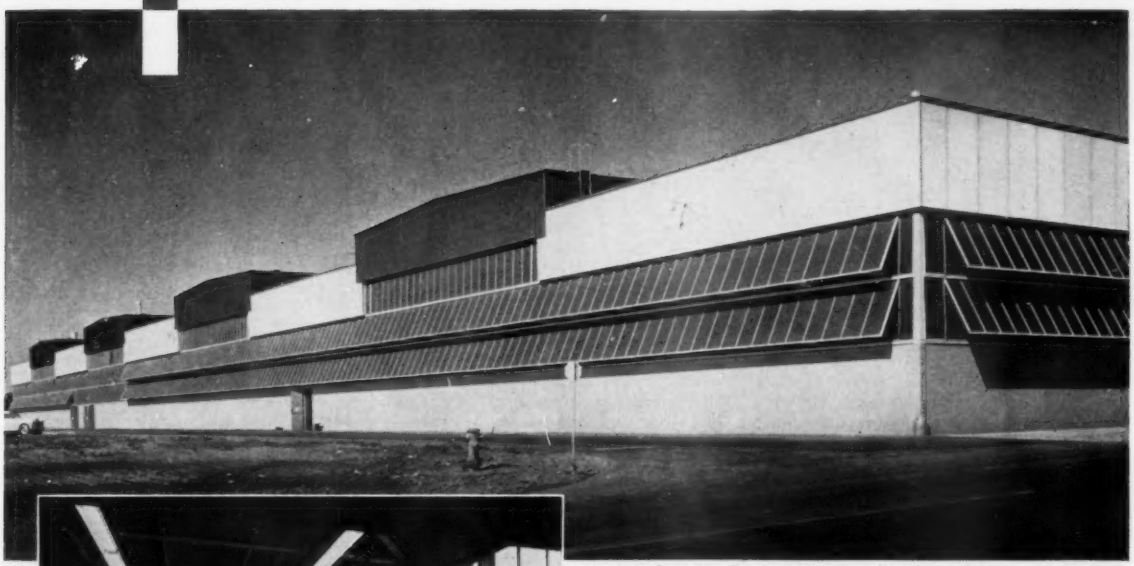
LIGHT and AIR without HEAT and GLARE

Coolite Installed in Top Hinged Windows Floods Factory with Conditioned Daylight

Excellent ventilation and plentiful, eye-easy, natural illumination promote employee efficiency and morale in this United States Electric Motor Plant, Anaheim, California. The hinged windows are glazed with Coolite, Heat Absorbing, Glare Reducing Glass to provide the finest, low-cost daylighting.

Coolite diffuses better light deep into interiors, eliminates contrasts that cause costly visual errors. Coolite absorbs up to 50% of unwanted solar heat rays, helps keep work areas cooler. Employees see better, feel better, work better, under "Cooliting."

This outstanding plant also uses diffusing Wire Glass for excellent daylighting plus protection against breakage and fire in vulnerable areas. Installed in doors, windows, skylights, Mississippi Wire Glass (Approved Fire Retardant No. 32) helps to bottle up small fires . . . keep them from roaring into costly conflagrations.



Architects: Smith, Powell & Morgridge. Three Mississippi patterns were employed in this plant: Coolite, Heat Absorbing, Glare Reducing Glass, 19,212 sq. ft.; Smooth Rough, 5,256 square feet; Coolite Wire, Glare Reduced, 5,377 sq. ft.

Let Coolite brighten your production picture with better daylighting. Specify glass by Mississippi. Available in a wide range of patterns and surface finishes through leading distributors.

Write today for free literature.
Address Dept.13.

see our catalog in Sweet's or write for copy

MISSISSIPPI GLASS COMPANY

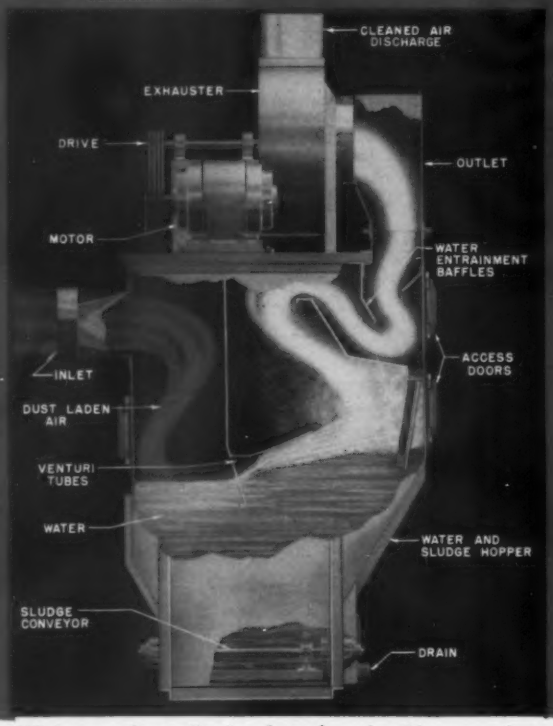
88 Angelica St. • St. Louis 7, Missouri

NEW YORK • CHICAGO • FULLERTON, CALIFORNIA

WORLD'S LARGEST MANUFACTURER OF ROLLED, FIGURED AND WIRED GLASS

For more facts circle 546 on Reply Card

NEW PANGBORN VENTRIJET
Gives Efficient Wet Dust Control



Efficient wet dust collection depends on breaking water into particles and mixing it with the dust. The new Pangborn VENTRIJET Collector utilizes venturi tubes to achieve this effect. As dust-laden air enters the inlet chamber, heavier dust particles sink to the bottom. The air stream then passes through the venturi tubes at high velocity, drawing water with it and breaking it into minute particles. These particles mix thoroughly with the remaining dust in the air and give the VENTRIJET its high operating efficiency. In the outlet chamber, the resulting sludge settles to the bottom for removal. Eliminator sections remove water droplets in the washed air and the cleaned air is then discharged. The result is peak performance in a minimum of space.

Pangborn VENTRIJET offers these advantages:

- Complete, self-contained unit with low headroom, minimum floor space
- High air velocity through venturi tubes insures thorough mixing of air and water
- Venturi tube design results in minimum pressure loss and provides uniform flow—no narrow channels to become choked with sludge
- Tube design and thorough washing action enable collector to handle heavy loads.

For full details, write to PANGBORN CORPORATION, 3200 Pangborn Blvd., Hagerstown, Maryland.

3D

Pangborn CONTROLS DUST

For more facts circle 547 on Reply Card

OPERATION—PRODUCTION

(O and P begins on page 56)

Compact installation of divided sump and two pumps serves cooling tower

per cent more water than previously, the cost is actually 1/15 what it would have cost without the tower.

As devised by Mr. Miller, the system involves a central, divided sump into one half of which cooling water from all operations is dumped. From this sump, the water is pumped to the cooling tower, then flows back into the other half of the sump as cool water, for distribution to the system.

Now maintaining 85 psi at 27 gpm, the system is capable of later expansion to 75 gpm. A 1½-hp pump moves the water from the "hot well" to the cooling tower at 30 psi, and a 7½-hp pump moves the cooled water through the machine and furnace cooling systems at 85 psi.

Suggestors "Tell All"

Outsize ear, connected to microphone, lets pencil-shy employees "talk" their suggestions. Microphone relays information to tape recorder for Suggestion Committee appraisal at General Electric Company's Medium Induction Motor Plant, located in Schenectady, N. Y.

A good start is a sure way
to maintain highest boiler efficiency

Cleaver-Brooks factory-trained servicemen instruct your operating personnel and adjust your boiler for peak efficiency. This service doesn't cost you a cent.

OTTO POLZIN is a typical Cleaver-Brooks factory-trained serviceman. He is shown on the job at Oilgear Co., Milwaukee, where he has just given two 125-hp Cleaver-Brooks boilers an initial start. Norbert Husting and Gordon Knischke of Oilgear are getting all the details on boiler operation and maintenance, including boiler blow-down procedure and tube cleaning.

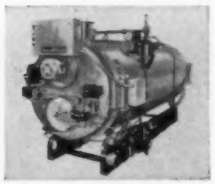
While on his "starting service call", Otto covered all of 32 items on his check list — such as the entire lubrication system, a CO_2 reading, inspected and cleaned relay points. In short, he *personally* made sure both boilers were "tuned" to perfection!

Cleaver-Brooks service is nationwide

This service is "standard practice" everytime a Cleaver-Brooks boiler is put into operation. And, as thousands of owners know, a phone call to your local Cleaver-Brooks representative brings this and other specialized services when needed.

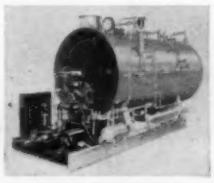
Factory-supervised starting is just one of many advantages of being a Cleaver-Brooks boiler owner. You get the ultimate in modern boiler design: forced draft with four-pass construction, hinged or davited front and rear doors for fast cleaning, 10-second gas or oil interchange — just to name a few features.

Get the full story on the complete line — sizes from 15 to 600 hp; 15 to 250 psi. Call your nearby Cleaver-Brooks representative or write direct. Cleaver-Brooks Company, Dept. K, 364 E. Keefe Ave., Milwaukee 12, Wisconsin, U.S.A. Cable Address: CEEBEEWEST — all codes. Ask for catalog AD-137.



MODEL CB — Most silent-running boiler on the market. Ideal for schools, hospitals. Sizes: 15 to 150 hp.

MODEL LR — Standard of the industry for steam or hot water service in heating or processing applications. Sizes: 200 to 600 hp.



Cleaver-Brooks

TWENTY-FIVE YEARS OF LEADERSHIP
BY THE ORIGINATORS OF THE SELF-CONTAINED BOILER

For more facts circle 548 on Reply Card

Automotive industry swings

See it at the Metalworking Show

The WEST-ING-ARC CO_2 process can be seen in action at the Metalworking Show in Cleveland, October 8 thru 11, Booth 1711.

to WEST-ING-ARC CO_2

...to get 30% faster welds — at 50% less cost

The automotive industry, and other industries as well, are constantly proving the multiple advantages of new WEST-ING-ARC CO_2 on high-speed production lines—for the welding of frames, spring seats, rear-axle housings, drive and transmission housings, bumper jacks, etc.

Like these high-volume producers, you'll find you get sound welds without spatter... without preliminary preparation... without after-cleaning... without grinding... no time-outs. Here are some of the outstanding features of WEST-ING-ARC CO_2:

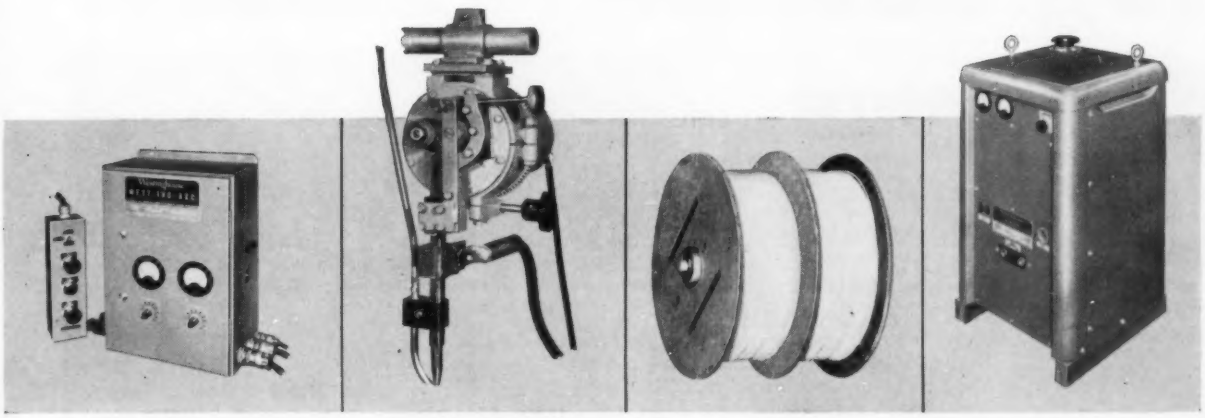
- Semiautomatic hand gun
- Light and heavy-duty automatic head—with side-delivery nozzle
- Semiautomatic, automatic or spot welding
- Mild steel, aluminum or stainless steel welding
- Flexibility—CO_2, argon or submerged arc
- Operator's remote control station
- Constant potential selenium rectifier-type power supply with automatic voltage compensation

All this—and at greater operating savings for you!

Call your local Westinghouse welding specialist today. He will be glad to show you how you can increase your high-volume weldment production with WEST-ING-ARC CO_2. Or, write to Westinghouse Electric Corporation, Welding Department, P. O. Box 868, Pittsburgh 30, Pennsylvania. J-21976

WATCH WESTINGHOUSE!

COVER THE PRESIDENTIAL CAMPAIGN ON CBS TELEVISION AND RADIO!



WEST-ING-ARC CONTROLS are housed in a NEMA Type 12 enclosure and conform to J. I. C. standards. The enclosure is dust-tight and contains a safety interlock which disconnects the control circuit when the door is opened.

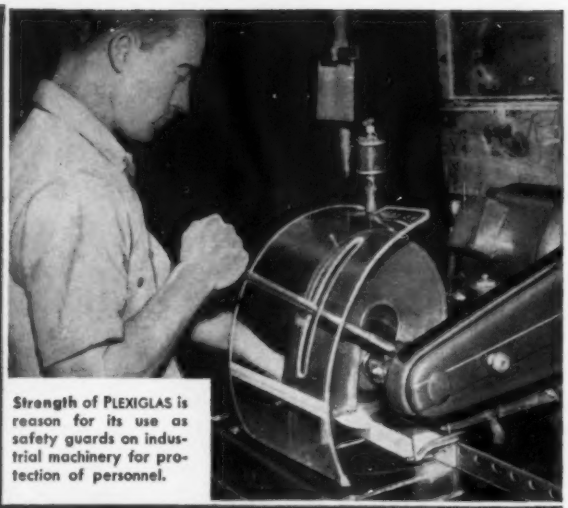
HEAVY-DUTY WELDING HEAD includes a side-delivery nozzle to eliminate spatter and slag deposits. It consists of a reversible, variable, slow-speed ¼ hp frame motor, geared to a spur-type gear train, plus a knurled drive roll to feed the wire.

TYPE MS-21 WIRE is a mild steel copper-flashed wire specifically designed for use with carbon dioxide shielding gas. This is a high-quality welding wire with a vitally controlled analysis. It may also be used for inert gas welding (reverse polarity).

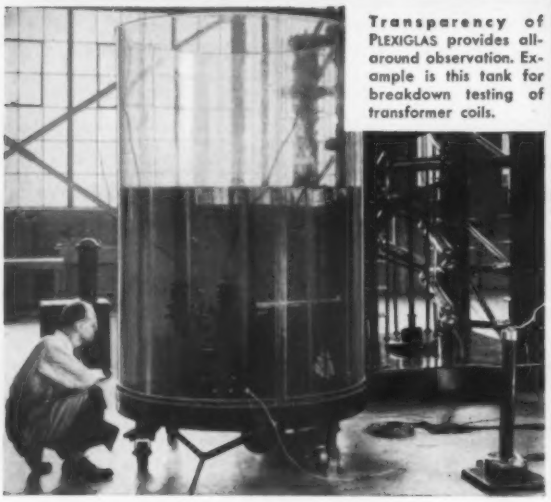
RCP WELDER supplies 600 amps at 34-volt load; is dependable and service-proved, like the Westinghouse RA welder. Current adjustments are automatically predetermined by the rate of wire feed. Output can be varied between 12 and 40.5 volts.

For more facts circle 549 on Reply Card

Acid-resistance of PLEXIGLAS permits safe inspection through corrosion-proof shields, like this hood over etching equipment.



Strength of PLEXIGLAS is reason for its use as safety guards on industrial machinery for protection of personnel.



Transparency of PLEXIGLAS provides all-around observation. Example is this tank for breakdown testing of transformer coils.

Breakage-resistance of PLEXIGLAS results in minimum replacement costs when material is used for window glazing.

Plexiglas —useful in so many ways around the plant

PLEXIGLAS® acrylic plastic is a mighty handy material around a plant. Shown above are just a few of the many ways it is being used to provide safety, increase efficiency and reduce costs in industrial operations.

PLEXIGLAS has crystal-clear transparency, great strength, and is light in weight. It is resistant to most chemicals. Electrical properties are excellent. The long-established reputation of PLEXIGLAS as "the outdoor plastic" indicates its durability under severe conditions of use, indoors or out. In addition, PLEXIGLAS can be heated and formed to almost any shape, can be sawed, drilled and machined like wood or soft metals. A brief investigation will show you many places in *your* plant where a material with this combination of advantages can be used profitably.

PLEXIGLAS R, the lower-cost grade, is especially suitable for industrial plant applications. Call your nearest dealer for information and quick delivery. Dealers are listed under PLEXIGLAS in classified telephone directories of most cities.

Send for This Booklet
Our "Design and Fabrication Manual" tells how to work with PLEXIGLAS. We will be glad to send you a free copy.

Chemicals for Industry

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WASHINGTON SQUARE, PHILADELPHIA 5, PA.

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Canadian distributor: *Crystal Glass & Plastics, Ltd., 130 Queen's Quay at Jarvis Street, Toronto, Ontario, Canada.*

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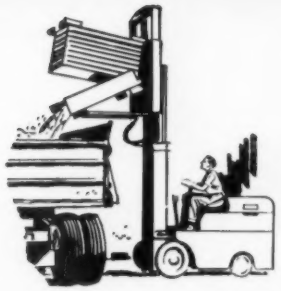
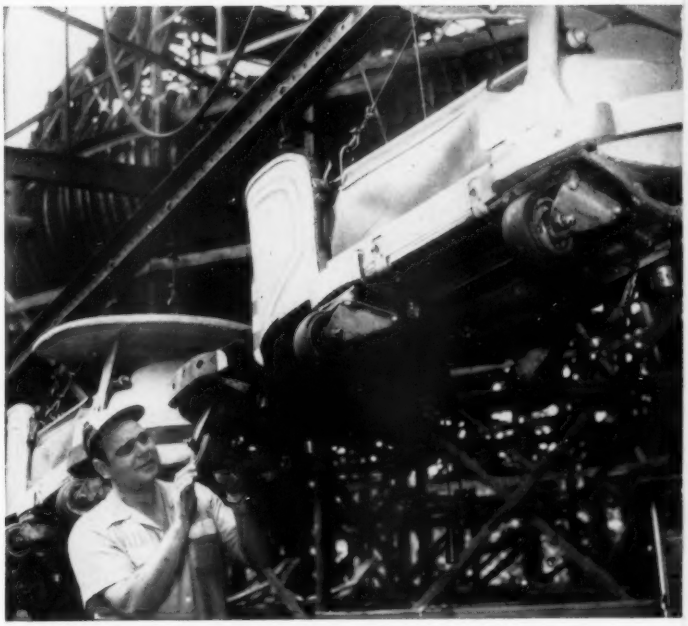
Typical Industrial Tire Problems Solved by B.F.Goodrich



Tires average 15-16 months' service! A 16,000-pound load of steel bars is "just average" for this fork truck at a large eastern steel plant. Although other tires failed within three months, the tires recommended by the B. F. Goodrich TW Analysis man are averaging 15 to 16 months in this heavy-duty service!



Thrill-seekers ride safely on BFG tires! Famous Euclid Beach Park in Cleveland had a problem. Tires on the coaster cars of the breath-taking "Flying Turns" required almost constant maintenance. After a BFG Analysis man studied the problem, he recommended B.F.Goodrich Vulcanized-on tires with Carrier compound and a smooth base mounted on aluminum hubs. Now the tires have a normal life span of a complete season.

Dana Corporation boosts tire life! Most other tires didn't last half as long as those recommended by the B. F. Goodrich TW Analysis man, says Garageman Anthony Bosch of Dana Corporation's Toledo plant. Materials handling equipment in this modern transmission factory hauls supplies, parts and finished goods through storage yards, over oil-soaked floors and sharp steel shavings.

B. F. Goodrich tires used 100%! Why? Because, says Plant Superintendent A. F. Madison, of Bower Roller Bearing Company, B. F. Goodrich industrial tires do a better job of resisting iron and steel scrap, oily floors and other tire hazards. And, he says, the B. F. Goodrich Tire and Wheel Analysis Plan puts exactly the right tires on every truck in our plant.

more

For more facts circle 552 on Reply Card

B.F.Goodrich

TW Analysis saves and saves and saves

Tires on small equipment can be important, too! Greeley General Warehouse in Cleveland installed rubber tires on hand-type barrel trucks. After a short trial, workers refused to use the trucks. "Back-breaking," they said. A TW Analysis revealed that the tires were too narrow for easy rolling with the loads carried. B. F. Goodrich Vulcanized-on tires with wide treads were installed. Les Carrier of Greeley says, "Our men are happy now. Traffic moves faster. And the condition of the tires after much hard service speaks well for the B. F. Goodrich recommendation."

2,000 materials handling units in one plant! Willys Motors operates more than 2,000 materials handling units in their Toledo plant. The tires on these units are exposed to almost every known tire hazard. According to Major Mechanic Harold Roberts, the B. F. Goodrich Tire and Wheel Analysis here resulted in "far longer, trouble-free tire service — and this saves us money."

BFG tires wear longer, resist cuts better! The supervisor of truck repairs at this large Detroit stamping plant reports, "B. F. Goodrich industrial tires are hard to beat. We find that they wear longer and resist cuts better." That's because the B. F. Goodrich TW Analysis man matched the tires to the job.

B.F.Goodrich
FIRST IN RUBBER

B. F. Goodrich Tire Company
A Division of The B. F. Goodrich Company
Department TW-596, Akron 18, Ohio

I would like further information on your FREE TW Analysis.

NAME_____

COMPANY_____

STREET_____

CITY_____ ZONE____ STATE____

Here's how you can get a FREE TW TIRE AND WHEEL ANALYSIS

Do you know which industrial tires —which types, sizes, tread designs and compounds—are right for your materials handling jobs? Your B.F.Goodrich Tire and Wheel Analysis man can give you the answers. He'll make a free survey of your operations, then give you unbiased advice. His recommendations could save you as much as 50% on tire costs, up to 20% on maintenance costs. Just mail the coupon. This B. F. Goodrich service costs you nothing. A consulting service is available to manufacturers of materials handling equipment.

***Specify B. F. Goodrich* tires when ordering new equipment**

For more facts circle 552 on Reply Card

Rolling Steel Doors

Manually, Mechanically, or Electrically Operated

MAHON CHAIN-GEAR OPERATOR

MAHON STANDARD POWER OPERATOR 920-P

For openings in industrial plants, warehouses, loading docks in commercial buildings, and railroad transfer docks, rolling steel doors offer the advantages of permanence, lower maintenance, greater security and protection against intrusion and fire, and the important space-saving and timesaving features of vertical roll-up action. No other type of door can compare with the everyday operating convenience of an electrically controlled power operated rolling steel door. The vertical roll-up action occupies no usable space either inside or outside of the door opening. There are no overhead tracks or other obstructions to interfere with crane handling adjacent to door openings—the door curtain is compactly rolled up above the lintel safe from damage when the door is open. Quick-opening, quick-closing Power Operated Rolling Steel Doors, with signal arrangements and remote push-button control stations, offer the ultimate in convenience and timesaving operation . . . and their all-metal construction gives you the permanence which assures a lifetime of trouble-free service. However, before you select a Rolling Steel Door, check Specifications carefully . . . you'll find extra-value features in Mahon doors—for instance, the galvanized material in Mahon curtain slats is BONDERIZED and DIP-COATED with synthetic enamel which is baked on at 350° F. prior to roll-forming. You will find many other quality and design features in Mahon Rolling Steel Doors that add up to a greater over-all value. See Sweet's Files for information including Specifications, or write for Catalog G-57.

THE R. C. MAHON COMPANY • Detroit 34, Michigan

Sales-Engineering Offices in Detroit, New York and Chicago • Representatives in Principal Cities

Manufacturers of Rolling Steel Doors, Grilles, and Automatic Closing Underwriters' Labeled Rolling Steel Fire Doors and Fire Shutters; Insulated Metal Walls and Wall Panels; Steel Roof Decks and Long Span M-Decks; Permanent Floor Forms; and M-Floors (Electrified Cel-Beam Floor Systems).

ROLLING STEEL DOORS, SHUTTERS AND GRILLES TO MEET EVERY REQUIREMENT

Three Mahon Power Operated Rolling Steel Doors 23 Ft. x 16 Ft. installed in double truck openings in an enclosed loading dock in Udylite Corporation's new plant in Detroit, Mich. O'Dell, Hewlett & Luckenbach, Architects. Barton-Malow Co., Gen. Contrs. Two more Mahon Power Operated Rolling Steel Doors 17'-2" x 23'-0" are installed in railroad openings in this new, modern plant.

M A H O N

For more facts circle 553 on Reply Card

G-E LAMPS GIVE YOU MORE FOR ALL YOUR LIGHTING DOLLARS

You'd have to search through all these cases of General Electric lamps to find even a single defect affecting performance

GENERAL ELECTRIC UNIFORMITY IS WHY—Each of these 42 cartons contains 24 G-E 40-watt fluorescent lamps. That's 1008 lamps! And they average a 99.9% freedom from physical defects that affect performance in service.

G-E LAMPS SAVE YOU MONEY—Replacing lamps that do not work properly due to physical defects can be expensive. In more ways than one. Often an electrician has to be called. That costs money. Work often suffers while the lamp is out. Even more expensive. And work is interrupted while the lamp is replaced. Add it all up and it's too much money. Make sure your lamps are free from costly physical defects by always specifying G-E lamps.

But General Electric lamp uniformity means more than freedom from defects. You can also count on uniform light output—less than 1% of all G-E 40-watt fluorescent lamps are as much as 5% below their published light output of 2500 lumens. And uniform life, too, means that after one year of service in single shift plants (2500 hours) an average of 99 out of 100 General Electric lamps will still be burning—98 out of 100 will still be in service after a year in double shift plants (4000 hours).

For more information on what uniformity in G-E fluorescent lamps means to you write: General Electric Co., Large Lamp Dept. PE-9, Nela Park, Cleveland 12, O.

Progress Is Our Most Important Product

GENERAL ELECTRIC

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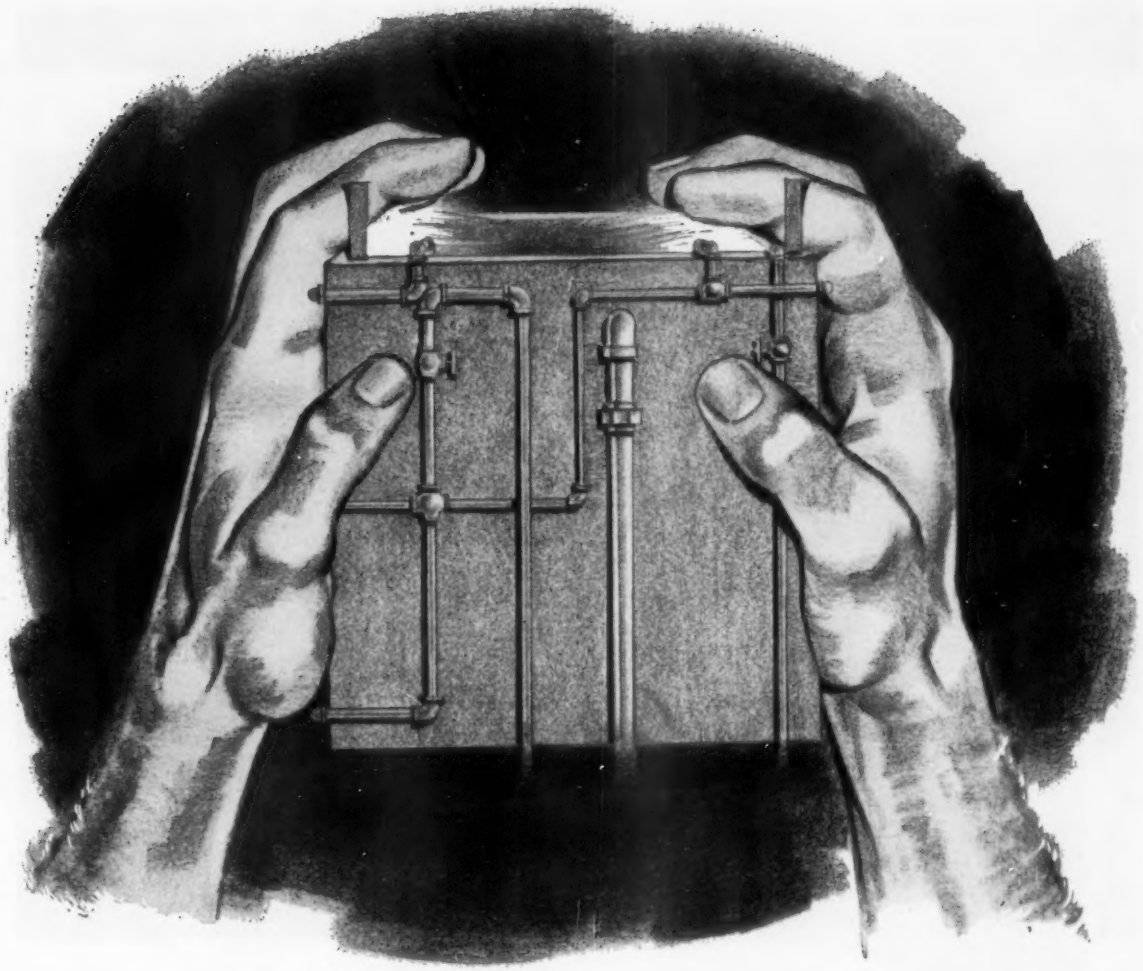

AAF captures corrosion from plating tanks

When AAF equipment is installed on plating tanks, there's no such thing as a close call—acid mists are *out*. Automobile finishes and roofs are *safe*. Destructive vapor and mists simply don't have a chance to create employee and community ill will and add to plant maintenance problems.

For more than a quarter-century AAF equipment has been keeping plant morale high, community relations good and maintenance costs low. AAF dust control has penetrated every industry, solved problems involving all types of process dust.

This experience, plus the world's most complete line of equipment, is at your service. Put your dust problems in the hands of dust control authorities—AAF. Call your nearest representative or write direct.

ROTO-CLONE AMERclone AMERjet
Dust Control Equipment

AAF Filters and Precipitators

Illinois Heating Specialties

BETTER AIR IS OUR BUSINESS

Herman Nelson Unit Heaters

Herman Nelson Portable Heaters

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American Air Filter of Canada, Ltd., Montreal, P. Q.

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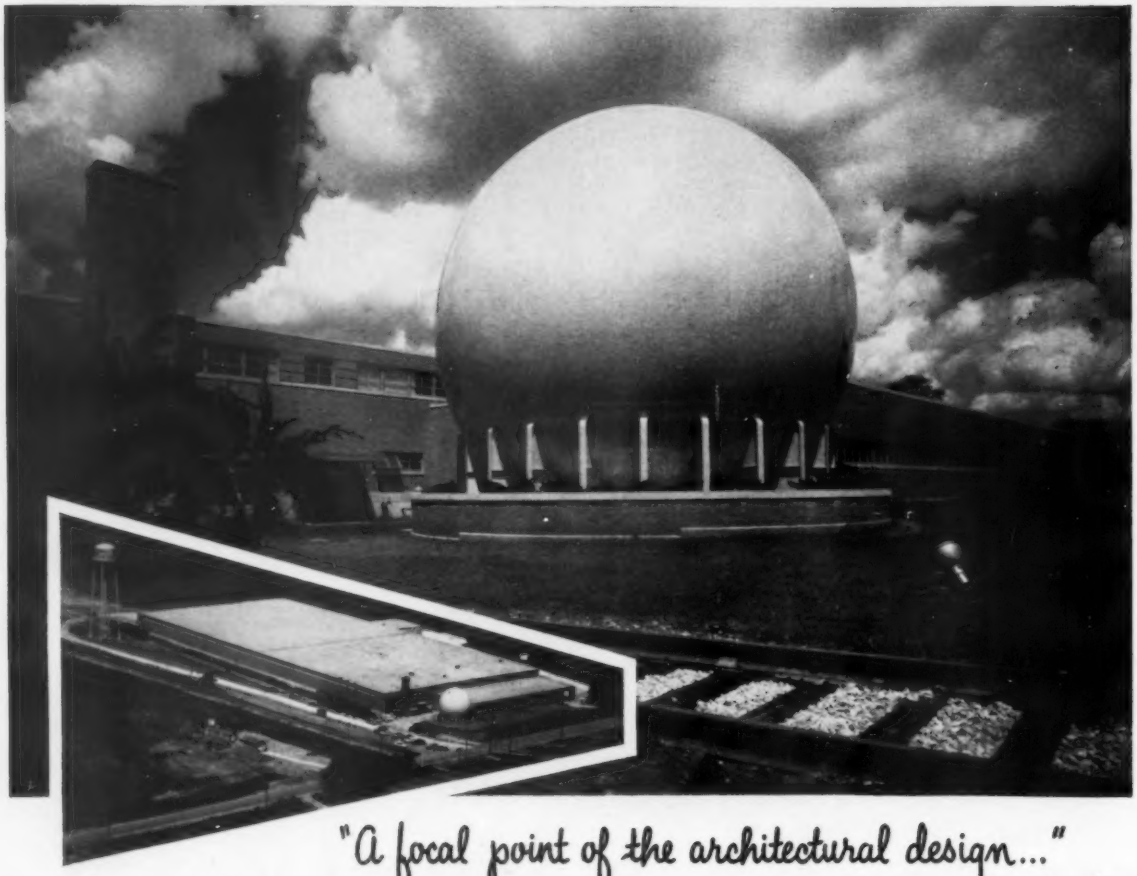
200,000-gal. Horton Spherical Water Storage Tank



"A focal point of the architectural design..."

at Waxdale

• A 200,000-gal. Horton® spherical water storage tank, used to supply the plant sprinkler system, was chosen for Waxdale, Johnson Wax, Inc. Shipping Center at Sturtevant, Wisc. According to J. P. Halama, Johnson's Staff Architect, "We decided to make the reservoir a focal point of the architectural design and therefore, chose a sphere because of its aesthetic value." In addition, a 100,000-gal. Horton elevated tank was also installed to provide dependable *gravity* pressure water supply.

CB&I has complete facilities to design, fabricate and erect steel plate structures of standard or unique design. Write our nearest office for further information.

CBI

Chicago Bridge & Iron Company

Atlanta • Birmingham • Boston • Chicago • Cleveland • Detroit • Houston
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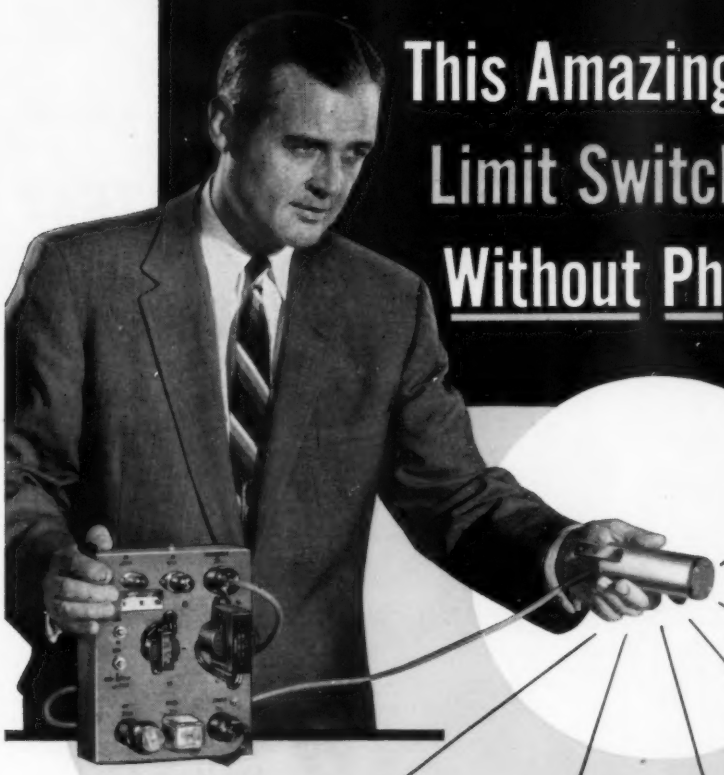
Plants in BIRMINGHAM, CHICAGO, SALT LAKE CITY and GREENVILLE, PA.

This Amazing New Limit Switch Operates Without Physical Contact!



Transducer (sensing head) is actuated by presence of magnetic materials over a wide range of sizes, shapes, weights, roughness, speeds

No moving parts. No metal-to-metal contact required for operation

Sensitivity up to 1 inch

Can be mounted in any position. Not affected by vibration

Small size (1⅞" x 6") Fits into tight spots

Non-magnetic material between the part and transducer does not affect operation

• Here's an entirely new concept in industrial limit switches! We've named it the **PROXIMITY LIMIT SWITCH** because it is actuated by the nearness of ferrous parts or materials. Since its operation requires no physical contact, it has unlimited applications in places where the use of conventional limit switches is either impractical or impossible! Its range of application is broadened, too, because the transducer (sensing head) is not affected by vibration or by the presence of non-magnetic material.

In paint spray systems, on production line presses, multiple process machines, heavy automation equipment—there are literally scores of places where this amazing new PROXIMITY SWITCH will do the job better!

ASK YOUR SQUARE D FIELD ENGINEER FOR A DEMONSTRATION. OR WRITE FOR PROXIMITY LIMIT SWITCH BULLETIN. ADDRESS SQUARE D COMPANY, 4041 NORTH RICHARDS STREET, MILWAUKEE 12, WISCONSIN

***NOW...EC&M* PRODUCTS ARE A PART OF THE SQUARE D LINE!**

SQUARE D COMPANY

For more facts circle 557 on Reply Card

a new NICHOLSON STEAM TRAP

for capacities up to 800 lbs.

Model N-125 available through your local distributor, as well as your Nicholson representative.

Now you can have all of the operating advantages of Nicholson design simplicity and rugged construction in the new, competitively priced Model N-125 steam trap for lower capacity applications.

Like other traps in the Nicholson line . . . it combines a unique thermostatic bellows, large orifice, and fast, intermittent valve action to assure effective and economical discharge of condensate and air from steam lines and equipment.

The Model N-125 has a maximum discharge capacity of up to 800 lbs. of condensate per hour at pressures up to 125 lbs. It operates on a temperature differential of only a very few degrees. Its tight, positive shut-off avoids dribbling, leaking, wasting steam.

NICHOLSON

W. H. NICHOLSON and Company

TRAPS • VALVES • FLOATS • METAL PARTITIONS
LAUNDRY, DRY CLEANING AND PRESSING MACHINERY

14 OREGON STREET, WILKES-BARRE, PA. • SALES AND ENGINEERING OFFICES IN 98 PRINCIPAL CITIES

For more facts circle 558 on Reply Card

COURT DECISIONS — a summary of legal findings of interest to the plant engineer

Prepared by Albert Woodruff Gray

Negligence in Metal Processing

METAL MACHINE parts were delivered to an Ohio company for heat hardening, then sent by that company to a metal cleaning company for a pickling bath to rid the metal of an oxide scale.

After the pickling process, the parts were so pitted and reduced in size that they were unfit for use. The heat hardening company sued for damages. To that action the defense was set up by the metal cleaning corporation that the company, bringing this suit and claiming damages, did not own the material and consequently had not been damaged and had no grounds for recovery.

Of this defense, the Ohio court said, "Upon recovery by the heat treating company of the full amount of the damage to the property, the company holds for itself its own damages growing out of its connection with the material and the remainder for the use or in trust for the owner." Southwest Heat Treating Co. v. Cleveland Metal Cleaning Corp., 130 N.E. 2d 851, Ohio, December 30, 1955.

Manufacturer's Liability

FOOD FOR airplane passengers at the St. Louis Municipal Airport was transferred from the basement, in aluminum containers on a power driven belt. It was then discharged, at ground level, onto a gravity roller conveyor from which the containers were loaded onto trucks.

When an employee of the food concessionaire lifted one of these food containers from the conveyor to the truck his hand caught in the conveyor belt. He brought suit against the company installing the conveyor system on the ground that the negligent designing of the conveyor was the cause of his injury.

The Federal appellate court held that no liability rested on the manufacturer of this system. "The manufacturer or seller," said that court, "is not liable to third persons who have no contractual relations with him for negligence in the construction, manufacture or sale of articles manufactured or sold. There are, however, exceptions to this broad rule, for example, where the article sold is inherently or immanently dangerous. The term 'immanently dangerous' does not imply that the article sold must at all times be immanently dangerous, such as poisons or explosives are known to be. It suffices if the nature of the thing sold is reasonably certain to place life or limb in peril and was negligently made, for then it becomes a thing of danger.

"In order to hold the manufacturer responsible in this case it must be found that the conveyors were inherently or immanently dangerous. The record justifies no such conclusion." Standard Conveyor Co. v. Scott, 221 Fed. 2d 460, May 3, 1955.

Injury from Epileptic Attack

EXAMINED BY A company physician and accepted as physically fit, an employee afflicted with epilepsy was assigned to work in the brass department, given a respiratory to prevent the inhalation of dust and directed to shovel hot sand.

Suddenly, frothing at the mouth, this employee dropped to the floor, falling into the hot sand and burning his hands and arms. In proceedings under the Workmen's Compensation Act for these injuries, a reward was denied by the lower court and that decision reversed by the Kentucky Court of Appeals.

"The employee was hired to work in this plant after passing the preemployment physical examination. He was required to wear a special face mask to protect his respiratory system. There were unusual hazards and risks in the physical conditions of his place of work.

"Therefore, under these facts, the only fair and reasonable finding that could be made was that the peculiar hazards of his employment contributed to his accident and injury. We think there is a clear connection between the conditions under which the employee was working and the occurrence of the injury. By approving compensation this opinion is in accord with the modern trend toward liberality in favor of the workmen." Stasel v. American Radiator & Standard Sanitary Corp., 278 S.W. 2d 721, Kentucky, April 29, 1955.

Fumes from Coal Testing Plant

FOR TWO AND a half years smoke and gas fumes from a coal testing plant nearby had seeped into the rooms of a tavern and the premises shrouded in a thick yellow brown smoke. Tavern trade fell off. Customers said they "couldn't stand it," that it was "too much for them" and that they almost "choked to death."

At the end of this period, the tavern owner sued for an order restraining the operation of this coal testing plant. In his defense, the plant owner maintained that the area had been zoned for industrial use.

"One cannot locate his premises in an area of filling stations, coal yards, railroads, chemical plants and testing laboratories," he contended, "and justly complain of the ordinarily accepted noises and smells of such enterprises."

When the tavern owner secured a judgment, the testing plant owner appealed. In reversing this judgment, the Missouri appellate court said,

"The right of the tavern owner to the peaceful and uninterrupted enjoyment, use and occupancy of his premises was not absolute. The right is relative and the question whether a particular interference therewith is reasonable or unreasonable depends upon the circumstances of the case. What would be an unreasonable interference with the comfortable enjoyment of one's home in a residential area might be regarded as the normal, expected and inescapable concomitant of modern social conditions in the industrial section." Fuchs v. Curran Carbonizing and Engineering Co., 279 S.W. 2d 211, Missouri, June 10, 1955.

Defects in Manufacture

UNDER A CONTRACT for the manufacture of boxes to be covered with silver and gold paper for the Christmas trade of a New York department store, the store had stipulated the color, type and price of the paper to be used and that it be of a definite manufacture. It did not, however, stipulate as to the quality. When the paper was delivered to the box manufacturer it lacked uniform thickness, curled in applying, blistered and jammed in the machines.

In a suit by the box manufacturer for damages for an implied warranty of fitness, the paper manufacturer maintained in its defense that there could be no implied warranty. The store had specified the features of the paper and for such a warranty, the transaction must be within the provision of the Uniform Sales Act that,

"Where a buyer expressly or by implication makes known to the seller the particular purpose for which the goods are required and it appears that the buyer relies on the seller's skill or

COURT DECISIONS

judgment, there is an implied warranty that the goods will be reasonably fit for such purpose."

In its decision against the paper manufacturer, the court said of this defense, "The store made the arrangements concerning the type and color and when the box manufacturer ordered it specified the type and color required by the store. The box maker did not however specify quality. It merely ordered the goods, making known its purpose, leaving to the skill and judgment of the paper manufacturer the task of producing the paper which could be folded and glued to the boxes by the usual method. Had the box manufacturer specified the quality of the paper, giving exact specifications, it would of course be barred from asserting this warranty of fitness." Royal Pioneer Paper Box Mfg. Co. v. Louis de Jonge & Co., 115 Atl. 2d 837, Pennsylvania.

Beryllium Poisoning

TWO WOMEN, one the wife and the other the daughter of employees of a beryllium plant, died from poisoning in the handling of the clothes of these plant employees.

Minute particles of the metal had adhered to the men's clothing. For a period of five to eight years these particles had entered the lungs of the women and set up this fatal condition. The plant settled with the families of the victims and then sued an insurance company to recoup the payment under a general liability policy.

In this policy the insurance company agreed, "To pay on behalf of the injured all sums which the insured shall become obligated to pay by reason of the liability imposed upon him by law or assumed by him under contract for damages, including damages for care and loss of services because of bodily injury, sickness or disease, including death, at any time resulting therefrom, sustained by any person or persons and caused by accident."

In its defense to this action, the insurance company argued that these deaths had not occurred from an accident. Further, that to be within the coverage of an accident under the policy there must be a single, unexpected, distinct event that was the cause of the death.

In its decision against the insurance company, the court said of the interpretation, "The lodging of the metal particles in the lungs of the women were definite events whether unnoticed at the time or not. The important circumstance is that there is no evidence that they realized they were using a deadly poison. It follows that the absorption of the particles of poison in their lungs must be held to have been unforeseen by them and the result, their death, not to have been the natural or probable consequence of the performance of the routine household tasks involved." Beryllium Corp. v. American Mutual Liability Ins. Co., 223 Fed. 2d 71, June 1, 1955.

Anti-Noise Ordinance

CONVICTED BY a New Jersey court of violating a local anti-noise ordinance, the New York Central Railroad appealed. The railroad contended the ordinance was vague, indefinite.

The ordinance was, "Whatever loud and unnecessary noise, which disturbs the public peace between the hours of 11 o'clock P.M. and 7 o'clock A.M., is hereby declared a nuisance and is prohibited."

In sustaining this conviction of the railroad and holding the ordinance valid and enforceable, the court said, "A statute which forbids or requires the doing of an act in terms so vague that men of common intelligence must necessarily guess at its meaning and differ as to its application violates the first essential of due process of law."

To this, the court added the qualification, "In considering the language of a statute enacted for the preservation of the peace, it was necessary to consider the field encompassed and the impracticability of rigid guide posts. Where the object for regulation by the legislature is proper and the conduct intended to be prohibited is not easily described, except in general language, there is no constitutional restriction and no more than a reasonable degree of certainty can be demanded." State v. N. Y. Central Railroad Co., 116 Atl. 2d 800, New Jersey, Sept. 21, 1955.

Trade Secret Disclosures

SECRET PROCESSES for the marking and printing of code numbers, lettering and identification marks on packed cartons had been developed by a New York manufacturer. Employment contracts of this manufacturer with two employees stipulated that information relating to these processes was to be held by them in strict confidence.

In a lawsuit brought to prevent the disclosure of such information by the employees after they had left the employment of this manufacturer, the defense was made that as these processes had been patented since their disclosure to the employees and patents issued, that they were released from the obligation to hold these processes, which were the subjects of the patents, in confidence.

In its refusal to sustain this contention, the court held, "While the action was pending, the United States Patent Office issued several patents to the owners of these secrets. These disclosed some of the secrets but not all of them. These employees did not learn any of the secrets from the patents. They learned them in confidence while in the patentee's employ and improperly disclosed and used them long before the patents were issued. They contend, nevertheless, that the patents constitute disclosures which automatically terminated any action relating to secrets disclosed by these patents. Although there are decisions which suggest support for this position we believe that reason and the weight of authority are to the contrary." Adolph Gottscho, Inc., v. American Marking Co., 114 Atl. 2d 438, New Jersey, May 23, 1955.

Similarity of Design

AFTER A Pennsylvania company had manufactured a line of coffee mills for over 25 years, all the mills having the same shape, design, color and ornamentation, a competitor began the production and marketing of mills identical in appearance with the only distinguishing feature, the name of that company.

Of the defense to the action brought by the first manufacturer for this piracy of its good will, the Federal court said of this competitor's acts, "The boldness and evident sincerity exhibited by this manufacturer is a refreshing combination. It says that it is doing what the earlier manufacturer says that it is doing and that it has an inherent natural right to do so, and proposes to do the things which it is claimed it threatens to do and that such action is also right and proper."

When this controversy came before the Federal court on appeal, that court sustained the injunction against the sale of mills of the style and appearance of the earlier manufacturer. It was stated by the court,

"It is elementary law that when a simulation of well known and distinctive features is so close the court will assume that the parties intended the result they have accomplished and will find an intent to appropriate the trade of their competitor. There is evidence to show that purchasers have been deceived as to the identity of these mills but in the case of the Chinese copy such as they have offered to the public, such proof is hardly needed." Enterprise Mfg. Co. v. Landers, Feary & Clark, 131 Fed. 241.

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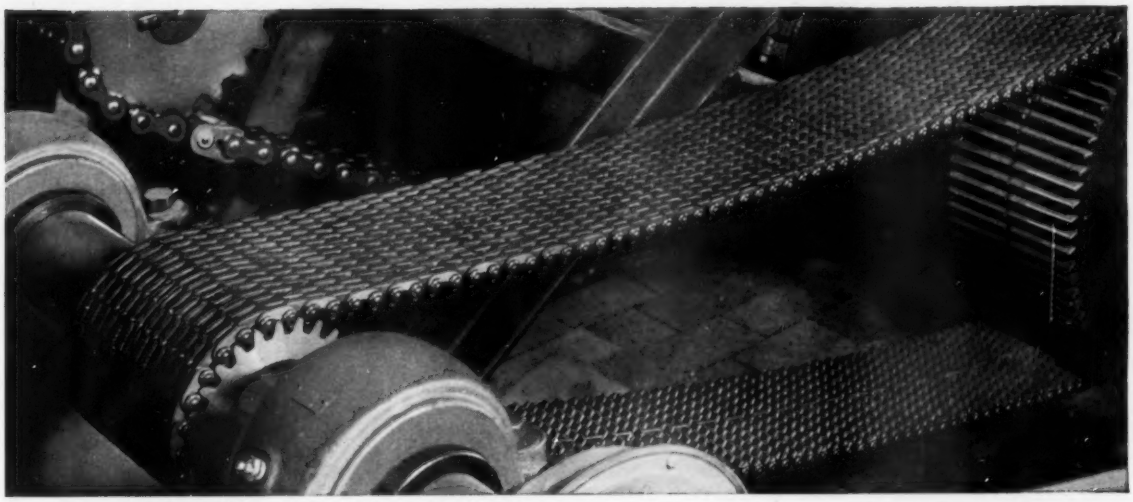
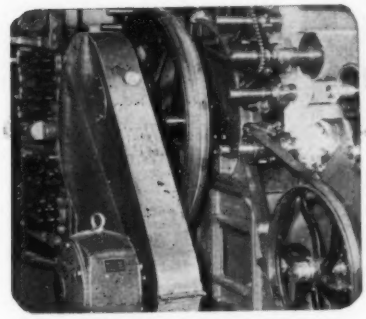


☐ **HIGH SPEED.** Link-Belt silent chain drives are noted for slipless dependability—maintain better than 98% efficiency whether operating over large or small diameter wheels or on long or short centers. For further details on these and more advantages, call your Link-Belt office or authorized distributor.



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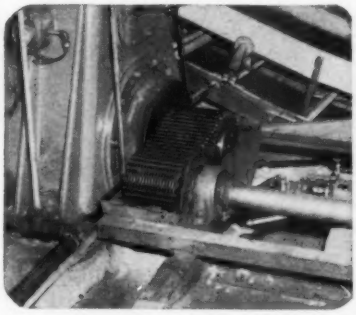

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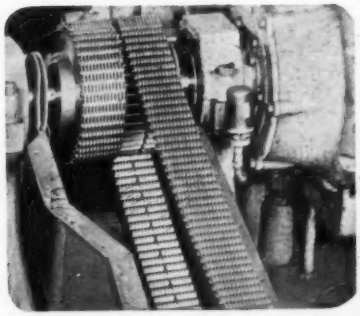
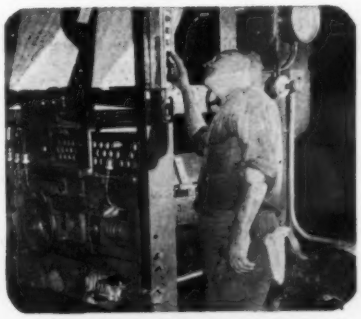


☐ **LIMITED SPACE.** Easy to assemble in close quarters, Link-Belt silent chain permits built-in drives, compact housings.



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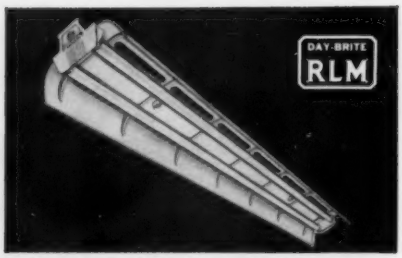
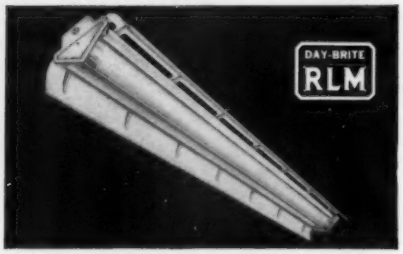
Lighting by DAY-BRITE Lighting Fixtures makes the big difference



Day-Brite CFI-10, with 10% upward lighting component



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spoilage losses are minimized when eye strain and fatigue are reduced with lighting by Day-Brite CFI (*Comfort For Industry*) fixtures . . . They are designed with slotted reflectors which *throw light upwards* as well as down on the work. Harsh ceiling contrasts are washed out—eye-comfort lighting results in greater accuracy, greater safety, less spoilage, improved production . . . Before you decide on lighting, consult your Day-Brite representative. You'll find him in your classified phone directory. Or, send for special CFI industry-lighting literature.

Extra light —no extra cost

By introducing slotted openings in the reflector tops of Day-Brite CFI (*Comfort For Industry*) fixtures, a portion of the light is directed upwards. This provides two advantages: (1) Longer periods of maintained illumination are assured because natural updraft ventilation keeps reflectors cleaner. This means extra light at no extra cost. (2) Harsh ceiling contrasts are washed out; eye fatigue and discomfort are reduced. Result: greater work accuracy, greater safety, less spoilage, improved production.

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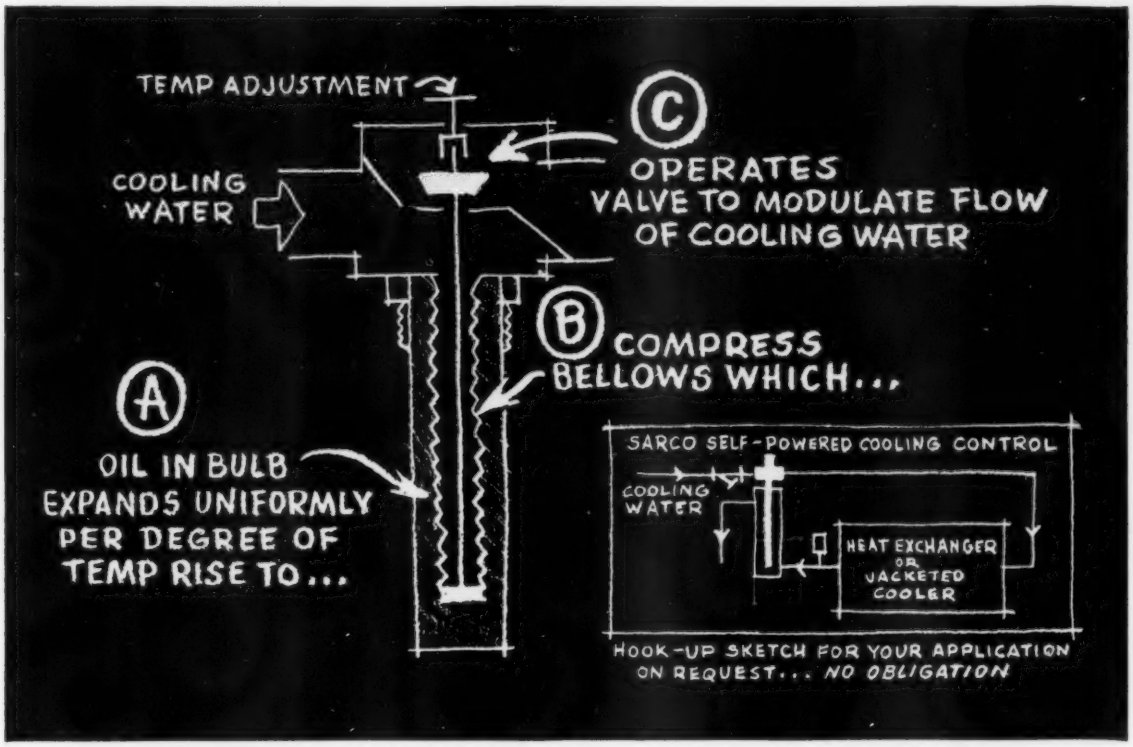
TEMP ADJUSTMENT
C
OPERATES VALVE TO MODULATE FLOW OF COOLING WATER
COOLING WATER
B
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A
OIL IN BULB EXPANDS UNIFORMLY PER DEGREE OF TEMP RISE TO...
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It pays to take responsibility off the operator's shoulders. Optimum *safe* temperature can be automatically assured by using Sarco Cooling Controls. They eliminate both overcooling and undercooling. They replace guesswork with certainty. Save man-hours and cooling water. Prevent damage to equipment.

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Simple, trouble-free design—as you can see above, a temperature control need not be complicated! Self-powered...no electricity or compressed air required. Self-contained...no exposed mechanism. Packless...no packing to wear or leak.

Each year, thousands of these fully modulating and sensitive Sarco Controls provide dependable service for firms such as Ingersoll-Rand, Butler Manufacturing Co., and Swift & Co.

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"My boss agreed . . .

'Let's use Westinghouse maintenance service . . . then we can really concentrate on production!'

"He knew that growing maintenance problems were already cutting into our manufacturing efforts. As plant electrical maintenance engineer, I had been studying the situation for some time.

"We were working old equipment harder than ever, with more shifts per week resulting in less time for maintenance. We simply couldn't afford prolonged down time because production losses mounted too rapidly.

"Production facilities had expanded considerably, but space for maintenance was still limited. We also lacked enough trained personnel and proper equipment. Our ability to handle conditions was inadequate.

"We turned to Westinghouse who with its repair facilities, renewal part stocks and field engineers, was able to solve our problem. We're saving money and the job is being done better than ever. You can probably do the same." J-95172-1

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To Maintain Production

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"When we called in Westinghouse . . .

"We learned new ways to prolong equipment life, lower maintenance costs

"We cut capital investment and reduced operating expense by letting Westinghouse service our electric equipment. It all started when the Westinghouse representative appeared and made his presentation, 'The Economies of Electrical Apparatus Repair.'

"He showed that Westinghouse had the men, materials and methods to do a superior job for us three ways: repair plants, engineering and field service and renewal parts.

"We liked the proposal and gave Westinghouse a larger share of our maintenance and repair work. Besides sound engineering consultation, we get round-the-clock service and a one-year guarantee. Equipment life has been prolonged, maintenance costs are lower and down time is reduced. Here's why.

"We broadened our repair facilities without investment or upkeep when we began to use some of the 38 well-equipped Westinghouse repair plants.

WATCH WESTINGHOUSE

"Westinghouse uses specialized and standardized repair methods with quality control checks that assure maximum performance from every repair job. Newly developed techniques are applied immediately to all repair jobs by skilled Westinghouse craftsmen.

"We benefit by new Westinghouse developments in design and modernization because Westinghouse repairs are backed by its entire manufacturing and engineering resources, including research. For example, Westinghouse has engineered individual rewinding processes like Bondite, Coilife, Thermalastic® and silicone to meet operational demands on electric equipment in any industry.

"*Westinghouse engineering and field service* tests, inspects and repairs our large apparatus that can't be moved readily.

"These skilled specialists eliminate trouble before it starts through preventive maintenance. This prevents critical shutdowns and reduces big repair bills . . . makes valuable equipment last longer. This service helps our own staff by furnishing exacting tests that are possible only with special equipment.

"Westinghouse field engineers redesign and rebuild old equipment to meet up-to-date needs. As in Westinghouse repair plants, they use the latest methods and processes for thorough, longer lasting repairs.

"*More value for our parts dollar* . . . that's our experience with genuine Westinghouse renewal parts. They're precision-built to fit right . . . save hours on repair jobs. We get original equipment performance, or better . . . because of advanced designs, proper methods and materials, thorough tests and inspection.

"Constant improvements through research go into Westinghouse parts and materials. Result is exclusive features, plus top performance, economy and convenience. For example, coils insulated with Bondite, Thermalastic and silicone will upgrade, and in some cases, actually up-rate old equipment.

"Thirty-four strategically located Westinghouse renewal parts warehouses with back-up stock at numerous manufacturing plants help us reduce our parts inventories as much as 50%.

"Why not call Westinghouse, like I did? Its personnel will gladly work with your staff to improve maintenance and boost your productivity."

Call your local Westinghouse sales representative for a presentation of, "The Economies of Electrical Apparatus Repair", and a personally guided tour through a local Westinghouse repair plant. Or write, Westinghouse Electric Corporation, 3 Gateway Center, P. O. Box 868, Pittsburgh 30, Pennsylvania.

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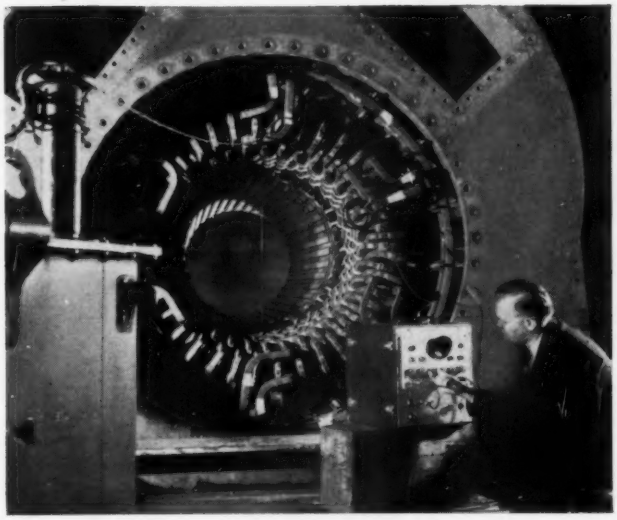
Slot discharge test detects capacitive discharge which can destroy coil-ground insulation. Slot discharge analyzer is an exclusive Westinghouse development.



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REFINERIES, CHEMICAL AND PROCESSING PLANTS on steam tracer lines, meter boxes, steam mains, separators, small dryers, pipe coils, small unit heaters, etc.

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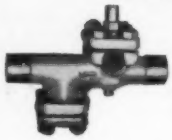
INTEGRAL-STRAINER HIGH PRESSURE TRAP



For *high pressures, high temperatures.* (Flanged or welding connections.)

YARWAY **IMPULSE® STEAM TRAP**

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Fig. 1. An example of one undesirable condition—reflected glare in a glass safety shield. Correction of such conditions can be made by using low-brightness, large-area source of light whenever it is necessary to view specular surfaces

Supplementary Lighting—

Its Problems, Applications and Possibilities

Growing complexity in modern manufacturing has brought with it an increase in severity of visual tasks . . . Proper illumination is becoming increasingly important . . . The following article reports on the author's analysis of some of his lighting problems together with recommended solutions

By E. G. ARSNOW, Plant Engineering, Merrimack Valley Shops, Western Electric Company, Inc.

A GENUINE NEED FOR a fuller appreciation of the benefits of proper illumination in the manufacturing plant has been created by a gradual increase in the complexity of the modern product and process. It must follow then that if our industrial lighting practices are to keep pace with the times, sufficient engineering effort and attention must be directed toward the solution of its many problems. This is particularly true in the matter of supplementary lighting where miniaturizations trends have pin-pointed inadequate techniques unsuited to the job.

On the following pages we will discuss the problems of supplementary lighting that face practically all plant engineers in greater or lesser intensity depending upon their type of plant operation. We will also demonstrate the solutions we have found, in our particular plant.

Fig. 2. Here is an adjustable incandescent lighting fixture offering high intensities for very difficult visual bench tasks

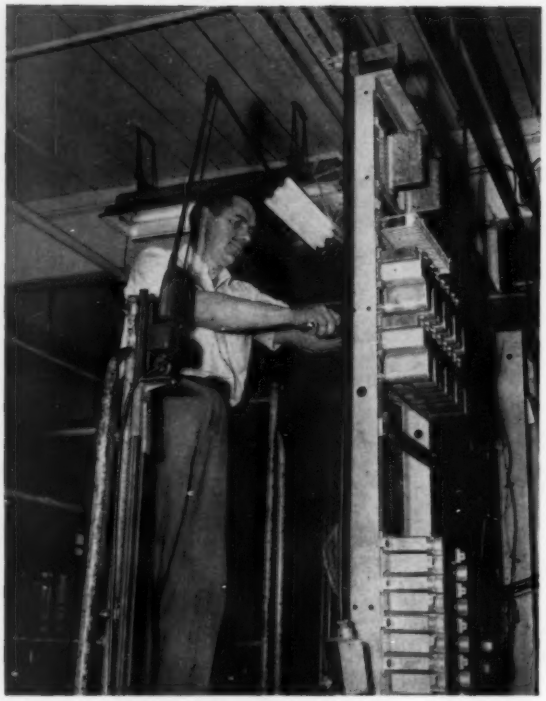


Fig. 3. Adjustable fixture designed to fit job. This Dazor lamp is fixed to a bracket which rides vertical channel

What Makes It Easy or Hard to See Things?

BEFORE DISCUSSING relative merits of various methods of local lighting, let us consider some of the fundamentals which offer the plant engineer a good approach to the problem:

1. Two factors that should be the subject for early investigation are physical size and orientation of material being viewed. Although it is obvious that smaller objects are more difficult to see, larger objects, poorly oriented, may also appear no larger to the eye. Since the human eye is essentially an optical instrument, it can see only the projected area of a surface which means that the visible surface area is a function of the cosine of the angle between the actual surface area and a plane perpendicular to the line of sight. It is quite obvious then that the "apparent" size of an object can be substantially "reduced" by poor orientation.

2. Color and color contrast also play an important part in the seeing process. For example, a color with a reflectance factor of 0.40 must be exposed to twice the intensity falling on another color with a reflectance factor of 0.80 for equal brightness. From this we find that brightness, which is so important in the seeing process, may be varied by a change in the reflectance factor as well as by variations in intensities. Contrasting colors with high reflectance factors also provide us with another variable by which we can improve visibility at the work position. Background colors that contrast with work materials permit the eye to discern outline details more readily, reducing operator visual effort.

3. Duration of the visual task also deserves close attention. Obviously, a difficult seeing task performed for a short time will tax vision to a lesser extent than one carried on over a longer period. What seems like only a slight aggravation when endured for a few minutes, may be so magnified in severity by time, that it becomes almost unbearable.

4. Because we are seeking adequate illumination on the work surface, it is imperative that compensation should be made for any deviation of the working plane from the horizontal. Here again the cosine law applies. Cosine corrected foot-candle meters are available for this type of application.

Since seeing is a function of a number of fundamentally important factors, each must be given serious individual consideration if adequate, comfortable illumination is to be provided.

Method Selection. Generally, the problem facing the plant engineer is the selection of a method of providing good local lighting to produce a level of illumination commensurate with the severity of the visual task, where existing levels supplied by the general lighting system are inadequate. A solution should include the selection of two values; the desired level of illumination and the brightness contrast. Each of these should be carefully evaluated. Each is important in the determination of the ultimate effectiveness of the installation.

Little will be said here of lighting levels because of the wide variation in needs and because the methods of selecting them are common knowledge. However, sufficient attention during the planning stages should be given to the subject of the brightness ratio

between the task intensity and that the general lighting system should be designed to provide illumination within the range of one third to one fifth of the total foot-candles. Smaller ratios cause eye strain and fatigue.

Visual Comfort. The most important factor of all in our good lighting "equation" is the visual comfort of the operator. Discomfort caused by poor illumination often reduces the will and ability of the individual to perform at maximum efficiency.

Creation and Reduction of Glare. Recently a manufacturer's publication offered a good definition of glare as "light out of place" and it went on to say that "it is any brightness within the field of view of such a character as to cause discomfort, annoyance, interference with vision or eye fatigue."

What are the Reasons for Glare?

MAJOR SOURCES OF glare encountered in an industrial plant are: 1. Adjustable fluorescent and incandescent lamps mounted on benches or machines can be a serious source of direct glare. Experience has shown that in areas where they appear in quantity it is difficult to avoid having many of these lamps turned by the operators themselves into someone else's field of vision. Consequently, glare is apt to be severe, especially when the surrounding area is dimly lighted. These lamps cause a high intensity to be concentrated in a small area producing high brightness contrast which contributes to discomfort and fatigue.

It is felt that installations of this type should be limited to individual and isolated applications where intensities above the average level are necessary.

2. Poorly designed or improperly positioned fixed bench-mounted fluorescent lighting fixtures are frequent offenders when located within the operator's field of vision without proper shielding. Because shielding and mounting heights are interdependent, they should always be given joint consideration.

Fixtures having small angles of cut-off should be reserved for installations at higher elevations because there the bare lamps are more apt to be further removed from the normal field of vision, but even there care should be taken to be assured of proper shielding. A fairly accurate analysis can be effected from a study of candlepower distribution curves and by providing a scaled drawing of the installation showing the angular relationship between the fixture and an "average man" seated at the bench. It is relatively simple by this method to determine whether or not the bare lamps will be visible and to measure the total quantity of flux in the critical 60 deg to 90 deg range. Obviously, the effectiveness of the addition of louvers to existing fixtures may also be studied in this manner with equal facility.

Bench-mounted fixtures should generally be limited to those designed for adequate large angle shielding and those having less than 5 per cent of the emitted lumens in the 60 deg to 90 deg range. This minimizes direct glare at the lower elevations.

In installations where existing fixtures are a source of glare, the effects of louvers or baffles should be considered. Transmission type diffusion mediums should be used with caution to avoid creating glare.

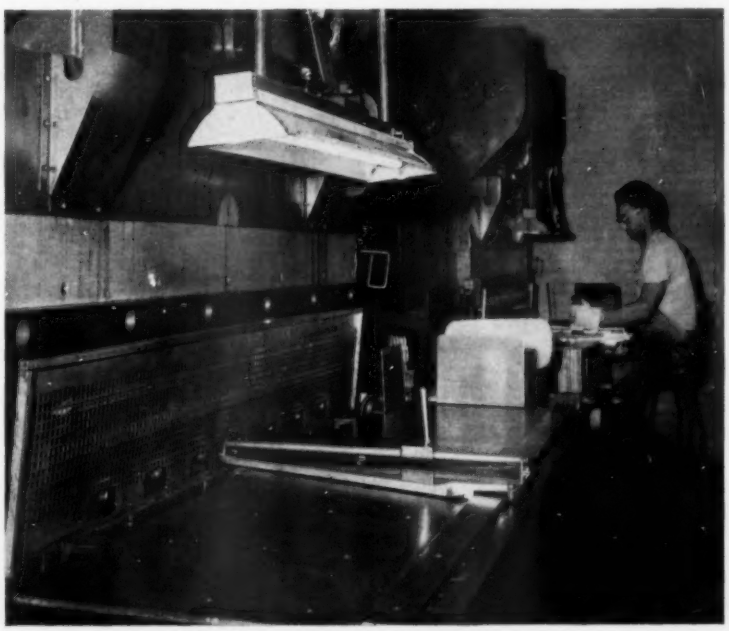
In some cases the mere rotation of a fixture ninety degrees, so that it is viewed crosswise rather than endwise, or vice versa, will produce the desired reduction in glare. Consult "Visual Comfort Index" data for guides in determining the more comfortable position.

3. Glare is equally undesirable whether it originates at a light source or whether it appears as a reflection from a mirror-like surface. As a matter of fact, in some instances reflected glare is by far the more serious problem, especially where the product itself has a high mirror finish; e.g., as in the processing of mica sheet and aluminum foil. Glass meter covers and glass safety shields are also reported as serious offenders. An example is the shield pictured in Fig. 1.

An effective weapon against this irritating direct glare is the indirect lighting system. The principle behind its success in preventing the reflections of bright spots is elementary. It produces none. Indirect lighting has long been known for its ability to produce uniform and well-diffused light.

We may say then that where glare is a problem the most effective means of its reduction is the diminution of source brightness and/or an increase in its height above eye level. However, experience has shown that in industrial applications, the reflected glare from mirror-surfaced product materials or tools cannot always be relocated. It then becomes necessary to substitute matte finishes and to reduce the combined areas of all the reflecting surfaces. Low brightness lighting fixtures should be provided to reduce the intensity available for reflection. This decrease in fixture brightness obviously will not create a reduction in the illumination level provided that low brightness sources of light, with the same lumen output, are substituted for the high brightness units.

Fig. 4. Example of adapting standard fixtures to seeing task at a brake press



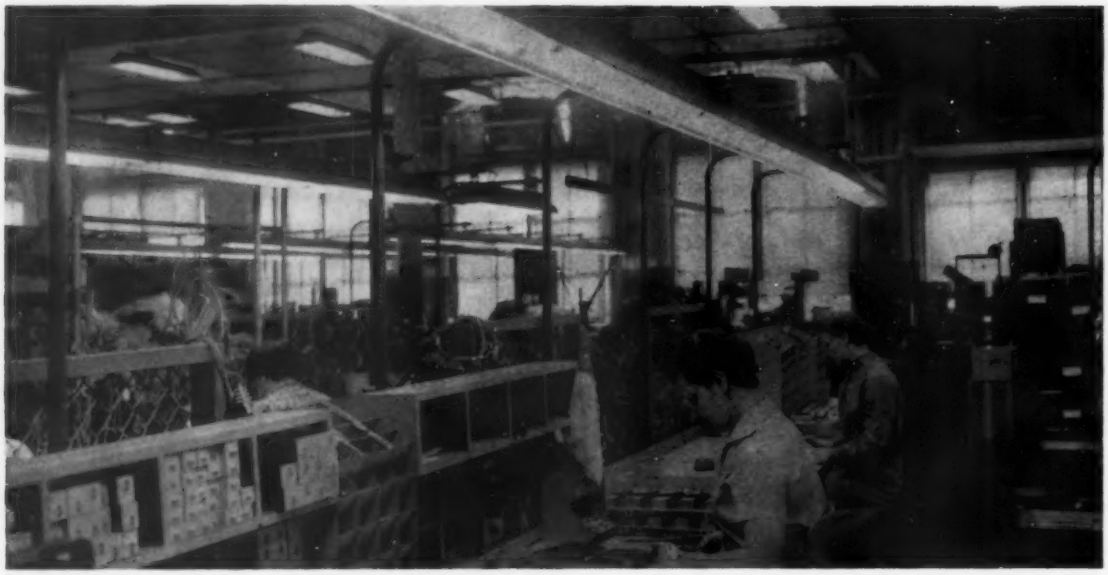


Fig. 5. Disadvantage of high brightness of adjustable fixtures may be avoided by careful selection of fixed facilities

Fixtures for Supplementing Bench Lighting

IN MANUFACTURING areas where higher illumination levels are desirable, it generally becomes necessary to decide between two alternative methods of achieving the desired results.

One method, perhaps the most common, emphasizes the role of local lighting. This theory being that greater over-all efficiency is obtained where local adjustable or fixed fluorescent fixtures in large quantities are depended upon to produce the desired levels in conjunction with a low level of general lighting intensity. In order to analyze this method we should first define its objective, viz., "to produce high intensities of illumination with maximum over-all efficiency."

Let us first deal with the "adjustable" type fixture. Main advantages being low installation cost, flexibility, and an ability to produce a high intensity within a small area in almost any direction. See Fig. 2.

Inherently, this is a high brightness device. It should be reserved for applications where this characteristic is desired or not objectionable. In general, intensities under 125 fc can be provided as economically by general lighting as by bench lighting. Guided by fundamental principles of good lighting, it must be agreed that high brightness in most cases is objectionable, especially where it appears in quantity. It seems reasonable to conclude that mass installations of local lighting should be avoided.

This leaves us with the reason of specific necessity that high brightness will be tolerated because other methods are economically unsound or unable to produce desired results. See Fig. 3.

Experience has shown that a well designed general lighting system for most applications is superior to a mass installation of "adjustable" fixtures. There is generally little justification for tolerating high brightness.

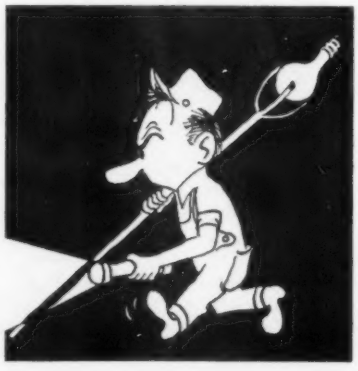
Adjustable fixtures have some economic advantages in first cost and in some cases in operation. However, should these savings be considered in the light of what could be purchased by them in the form of general illumination the reward for frugality seems inadequate.

Let us now examine the "fixed" bench-mounted variety, an example of which is shown in Fig. 5. It is possible to avoid the high brightness disadvantages of the "adjustable" fixture by proper selection of these fixed facilities. However, it is possible to create the same high brightness condition if sufficient caution is not observed in the design and installation stages.

In mass applications this method is relatively high in cost where shops are frequently rearranged. In most cases, the cost of moving fixed-bench lighting facilities constitutes the largest segment of the total bench relocation cost.

A comparison of first costs between fixed bench and overhead lighting on a cost per watt per sq ft basis (prepared by the author), has shown an economic advantage of $0.09 in favor of the latter.

This is not meant as an argument to illustrate the ineffectiveness or lack of merit of local lighting. On the contrary, local bench lighting is often necessary, but its limitations should be recognized. It is not designed for, or meant to be, a suitable substitute for good general lighting. It does serve a useful purpose in providing high intensities in isolated cases where population densities are low or where a small percentage of visual tasks demand a level in excess of the average.



Solutions to Problems in Local Machine Lighting

ILLUMINATION OBJECTIVES for machinery may be divided into two broad classifications: 1. Illumination for production operations. 2. Illumination for set-up and adjustment of tools.

It is difficult to generalize when analyzing the requirements for the lighting of production operations because of wide variations in machinery type and function; however, it is safe to say that a good, well-diffused general lighting system is certainly desirable.

Emphasis should be placed upon good diffusion in these areas, especially where highly polished measuring devices, such as micrometers, are being used. Tools of this type are extremely difficult to read in the presence of bright, poorly diffused light sources because reflected glare often masks the minute graduations. Large area diffuse light sources virtually eliminate this problem.

Quite often in machine operations it becomes necessary to adjust for the depth or alignment of a cut or to manually guide material in a cutting operation. Tasks, like this, generally require a high intensity in a relatively small area in order that minute details may be easily seen.

There are several approaches to machine lighting that have been time tested with satisfactory results. With a little imagination they can be modified and expanded to meet almost every situation encountered in the modern shop. An example of brake press lighting is shown in Fig. 4.

A problem needing special attention at one of our locations was overcome by the installation of a compact, 20-watt, low-voltage, modified aircraft reading lamp on the moving head of the machine. This permitted its narrow beam to be directed at the moving tool where high intensity was continuously needed. This is shown in Fig. 6.

Since requirements for operation are somewhat similar to those of setting up a machine, it is not surprising that the solutions are similar.

Probably the most common machine lighting for both operation and set up is the incandescent lamp on a flexible arm. Experience indicates that it is quite satisfactory for general machine use but in some instances it is used without the desirable assistance of good general illumination. Often, because of its high brightness, this type of lamp creates undesirable glare in areas where high polished supplies are used or other specular surfaces abound.

Another method that seems to be gaining popular acceptance is the application of Par lamps, both floods and spots, having self-contained reflectors. These lamps are generally mounted on the ceiling, wall or column near the machine and are beamed at the work place, providing illumination levels above those supplied by the general lighting system. It is important that the lamp be properly positioned to avoid directing the light into the operator's eyes.

Caution should be exercised in all cases to avoid the creation of islands of light in a sea of relative darkness.

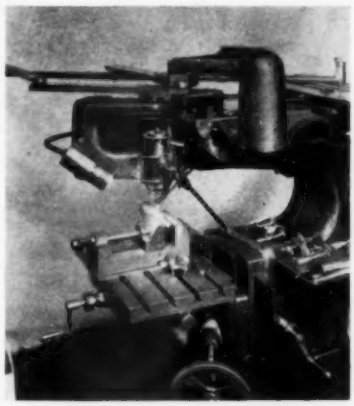


Fig. 6. Special-purpose machine lighting using a modified aircraft reading lamp that follows the high-speed tool

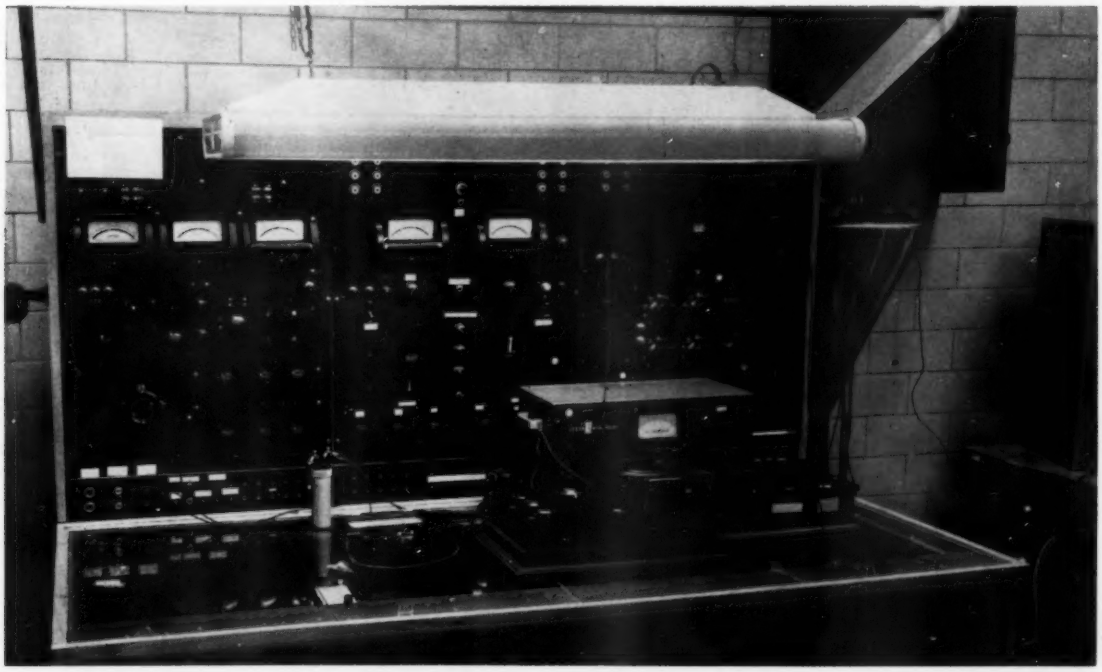


Fig. 7. Special-purpose bench lighting showing evidence of high-brightness contrast. Desirable correction would consist of refinishing panels in a light color to raise visual comfort level and eliminate contrast between lighting and background

Fig. 8. Single-lamp fluorescent, continuously mounted for use in rack areas. Best for continuous duty, uniform lighting

Fig. 9. This photo shows diagonal orientation of general lighting over racks. It permits flexible rack arrangement

Meeting Requirements for Storage Rack Lighting

REQUIREMENTS FOR THE illumination of rack areas differ considerably from those of other installations in the modern plant so perhaps it would be advantageous to define them for purposes of clarity. They are: provide, as nearly as possible, a uniform intensity on all vertical and horizontal surfaces within the rack aisle from the lowest to the uppermost shelf along its entire length. The visual tasks here may be subdivided into two categories; one to *identify* a specific tray, pan or shelf; the other to *select* parts from a tray, pan, or shelf.

Fig. 10. This is an example of good general lighting over racks in storage area

In order to obtain optimum operation results, it is highly desirable that the lowest pan in the rack should be as visible as the highest, which obviously means that intensities at each shelf level should be as uniform as possible.

Achievement of this near uniformity is attainable, according to one manufacturer, to a degree illustrated by a maximum-minimum intensity ratio of 2.4 to one, on a vertical rack face from top to bottom if sufficient attention is given to the selection of a suitable fixture. A point source of light is unable to produce the desired overall uniformity, hence, we must turn to something more suitable; a line source viz., the fluorescent tube. Most of the more recent applications are of this type, Fig. 8, employing a single tube with a parabolic or elliptical reflector in a continuous strip with louvers for endwise shielding. A few manufacturers are currently developing these fixtures with unique reflectors designed specifically for use in both library stacks and industrial storerooms.

Two of the more common systems in satisfactory operation, in addition to continuous strip lighting, are: (1) The use of general overhead lighting, Figs. 9 and 10, which in some instances is oriented over the rack aisles, and (2) The use of the incandescent "bin light" mounted in the rack aisle.

The first method is generally applied where storage racks are erected in general lighting areas. In such a case it is often difficult to justify, economically, the replacement of existing equipment. Sufficient justification might be made for reorientation to conform with rack spacing.

Because of the greater over-all efficiency of fluorescent lamps when burned continuously for long periods, they should be used for applications where lights are not turned off and on frequently. For intermittent use the incandescent lamp installation will generally prove to be more economical because its life is unaffected by this type of operation.

Hints on Lighting Truck Loading Positions

FOR MANY YEARS the problem of illuminating the interior of supplier's trucks has caused plant engineers no little concern. Relatively small openings at the doors and long, narrow interiors through which the light must pass does limit the number of methods one may use in arriving at a suitable solution. It is assumed that few are completely satisfied with present methods.

The most common lighting methods for truck loading positions are listed without comment:

1. Floodlights mounted on portable stands.

2. Provisions for handlamps supplied by a retractable cable attached to a cable reel.

3. The pendulum device known as an "Anchorlite" which is pulled down and hooked under the lip of the trailer top.

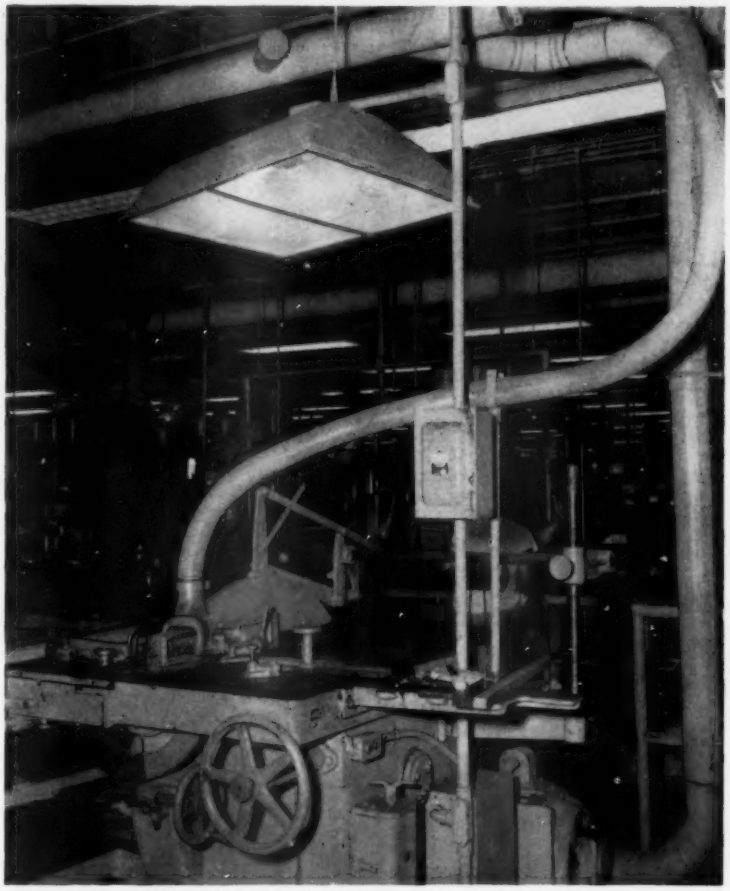


Fig. 11. Below: a good example of general lighting in a process area. Note the almost complete absence of shadows

Fig. 12. This low-brightness, high-intensity light source, illuminating a saw, eliminates the stroboscopic effect

4. Spot lights mounted in roof trusses and directed into truck openings.

5. Floodlights installed on short brackets on the sides of loading openings.

6. Floodlights for lighting vertical surfaces from a grazing angle known as a "Projectolite" has been mounted on a side wall projecting back from an auto court.

7. Headlight installations on fork lift trucks.

8. Truck interiors provided with permanent lighting fixtures.

9. Provisions for using "Skylight" roof panels.

Photos show parts of the rope drill conducted in Drill Number Five as shown on next page. Drills are essential to safety

Industrial Fire Departments —
Outline for Training, Coordinating This Emergency Team

By GEORGE E. DRISCOLL, Chief, Plant Protection, Worthington Corp.

APTITUDE, ABILITY, ATTITUDE — these are the requirements of a good fireman and a fire department is only as good as the men who comprise it. The human element is extremely important since fire and explosions seldom give a warning. They must be combatted on an instant's notice on their own terms. Disaster usually occurs at the most inopportune time and in the most inaccessible place.

A fire department is a valuable asset to any plant and although its primary duty is combatting fire it can also be called upon to meet any emergency that may arise. Team work is essential to a fire department and the personnel must be welded together with a bond of mutual respect. No individual can successfully lead a department without the full cooperation of each member.

Training to become a fireman is vigorous work—climbing ladders and stairways, laying out hose lines and manning lines under high pressure. These maneuvers must be executed constantly for the personnel to be prepared to meet an emergency. The personnel of Worthington Corporation's Harrison Fire Department consist of skilled men of various trades—pipefitters, welders, burners, garage mechanics, millwrights, office workers. They are a perfect blend to cope with any emergency, and have apparatus which can arrive at the scene, equipped with an assortment of tools, first aid essentials and modern fire equipment.

In organizing our Department considerable time was devoted to selecting the proper personnel because in a time of emergency there is no time for lengthy discussions or practice.

Drills at Worthington are conducted in a cycle to avoid monotony and yet achieve near perfection—our ultimate goal. Drills are held outdoors from April to October and are run at a fast tempo. Our slogan is "Accuracy with Speed." To accomplish this we work the men in groups competing against each other—raising and climbing ladders, advancing hose up ladders and laying out lines. This is vigorous work and the men thoroughly enjoy it. This is an indication of their greatness and one of the many reasons why I am proud to be associated with them. Sufficient time is spent on each drill shown in the accompanying table to assure competency in its execution, from the initial maneuver of coupling hose to the more complicated laying out of lines.

Fire fighting is hazardous, so safety is stressed in the handling of equipment. It is strenuous and serious work and there is no substitute for practice. The excitement at a fire, accompanied by adverse working conditions may

Outline of Worthington's Training Program and Drills

Drill Number One—Housekeeping

1. Storage and Handling of Flammable Liquids
   a. vapors
   b. ventilation
2. Static Electricity
3. Storage of Combustible Materials
   a. ventilation required
4. Defective Wiring
5. Clearance of Fire Lanes and All Equipment

Drill Number Two—Classification of Fire

1. Color Code Chart on Extinguishers
2. Extinguishers
   a. contents of each
   b. principle of extinguishing agent
3. Maintenance Required
4. Demonstration of Each Type on Actual Fires

Drill Number Three—Hose Drill

1. Coupling Hose
2. Attaching Nozzles
3. Hydraulics
4. Manning Lines
5. Siamesing Lines
6. Donut Roll
7. Maintenance of Hose

Drill Number Four—Ladder Drill

1. One-Man Raise
2. [illegible] Raise
3. [illegible] Lowering from Building
4. [illegible] Ladders
5. Lowering Ladder to Building
6. Hoisting Line to Ladders
7. [illegible] Ladder Carry
8. Maintenance Required

Drill Number Five—Apparatus Drill

1. [illegible] Load
2. [illegible] Lay
3. Straight Lay
4. Attaching Wye
5. Lead Lines
6. Advancing Lines Up Ladders
7. Underarm Carry
8. [illegible] Drill
9. [illegible]
10. [illegible] Rope
11. [illegible] Man's Drill

Drill Number Six—Flash Fires

1. Safety Precautions To Be Taken
2. Spontaneous Ignition
3. [illegible] combination of materials that may cause it
4. Smoke Explosions and Back Draft
   a. proper way to ventilate
   b. safety precautions to be taken
5. Sprinkler Systems

result in accidents by the improper carrying of an axe, transporting a ladder through a crowd or improperly placing it against a building. Too much sag weakens the ladder; if placed too erect it can be equally dangerous.

Conditions encountered in a smoke-charged building—the unseen fire—is probably the most dangerous as improper ventilation can cause a back draft or smoke explosion and result in the loss of life and property. Utmost caution is required at this type of fire and the following safety methods are discussed:

Vertical ventilation accompanied by charged lines whenever possible.

In opening a roof, the wind should be at the firemen's backs to allow flame and gas to escape in the opposite direction.

When breaking windows, stand to one side of the window and strike glass at top to prevent it from sliding down the axe handle.

In opening a door, stand to one side and place foot against it and open gently, as the concussion of a back draft could even remove the door from its hinges.

(Continued on page 230)

This excellent shot of a fog nozzle in action demonstrates "curtain" action

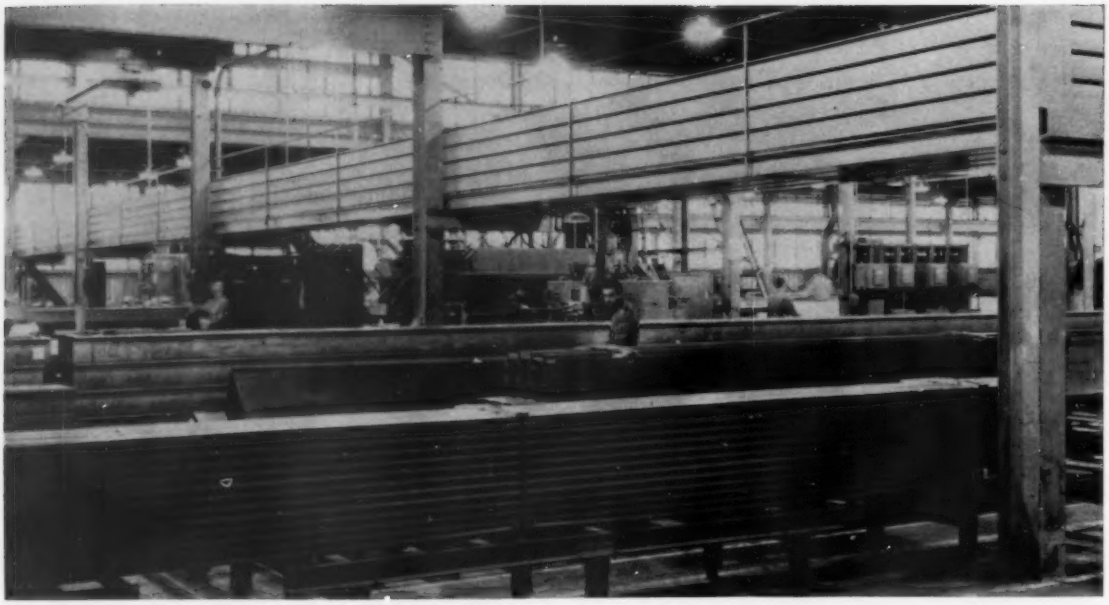


Fig. 1. View of one section of the plant shows the catwalk which is just one of a number of ways in which the company used its own products. Other company products used include: metal building panels, doors, ductwork and sash

Company Products Built This Plant

Most of the Building Materials Came from Fenestra Plants

Building a new plant? . . . If you are, look around to see if some of your company's products can be used in the new plant . . . That's what Fenestra did

By **BURT J. DRUMMOND**, Plant Engineer, Fenestra, Inc., and
R. J. LEWIS, Maintenance Superintendent, West Elizabeth Plant

WHEN THE COMPANY decided to expand the building panel production facilities by constructing a new plant at West Elizabeth, Pa., we did not have to go far for building materials.

Since the company manufactures metal building panels, doors and windows, all we had to do was make the necessary arrangements with the individual plant for our requirements.

The plant is located between the Monongahela River and a railroad siding, some miles from Pittsburgh. The roof over the manufacturing section of the plant is composed of 666 squares of the company's own roof deck. The roof over the office section of the plant consists of six-inch deep cellular steel panels of formed beams with a flat plate welded over a hat section.

The panels used in this section have an additional cover plate connecting the hat sections to form two smooth surfaces on either side. They have been acoustically treated by perforating the flat plate on the underside of the panel.

With the cover plate up and the perforated flat plate down and backed with a sound absorbent batt, the first floor office area has an attractive, finished acoustical ceiling.

This type of panelling is also used in the mezzanine area in the plant. Small parts and miscellaneous material are stored on the second floor and

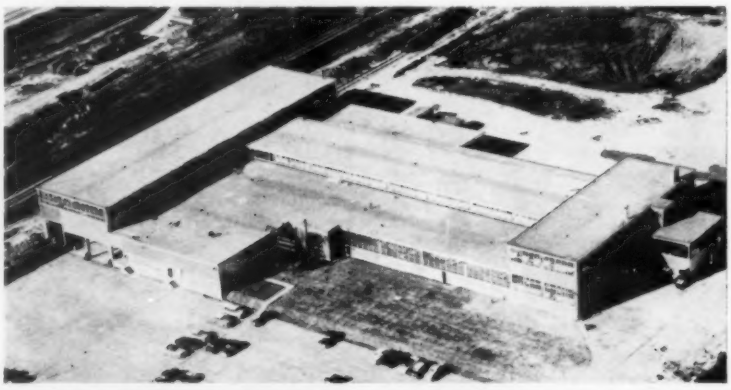


Fig. 2. Aerial view of the plant. In expanding these facilities, the company will take the panels right from the production line for use on the new project

the area beneath it is put to good advantage as production floor space.

Floors throughout the plant area are of poured concrete, but in the office area, the company's own electric floor panelling has been installed for easy access to electrical outlets for phone and business machines.

In the plant and office area, company-made wall and siding panels have been applied to a skeleton of structural steel.

Used As Ductwork, Also

Cellular panels are used as air ducts for the air-conditioned office, as well as electric ducts for overhead lights.

The exterior walls of the offices and the front of the building are composed of 105 squares of the company's three-inch deep wall panel. These are insulated sandwich panels, one half of the panel is 16-gage aluminum and one half is 18-gage steel, with the aluminum half of the panel used on the outside of the building. This presents a fluted surface that is functional as well as attractive.

The remainder of the exterior walls consist of 111 squares of uninsulated 16-gage aluminum siding, similar to the material used in the roof deck.

Interior partitions dividing the manufacturing area from other facilities, consists of 15 squares of three-inch deep, 18-gage aluminum and steel wall panels. Insulation in these panels is of a glass fiber material. A masonry wall separates the offices from the plant.

Another way in which we have used company-made materials is in the catwalk. The catwalk is suspended from the structural steel by steel straps on six to eight foot centers. There are convenient flights of steps from the catwalk to the departments below. The floor of the catwalk is made of company panels, covered with a plywood pad. The guard rails running from the floor to waist height are the company's ribbed panels set on edge.

Windows in the West Elizabeth plant, naturally, are of Fenestra sash. All the doors, frames and hardware in the plant are also company-made.

New Panels for Addition

However, the story does not end here. Sometime in 1956 work will commence on another addition to the plant. Company engineers will be utilizing a recent company development, a field assembled panel, in the expansion of the plant.

For this particular project, the field assembled panels will be taken from the rolling mill to the end of the building where construction will take place. They will be assembled and erected on the spot with simple welding and bolting equipment.

Fig. 3. The roof in the manufacturing area is composed of 66 squares of the company's own roof deck. Naturally, Fenestra sash is used throughout the plant

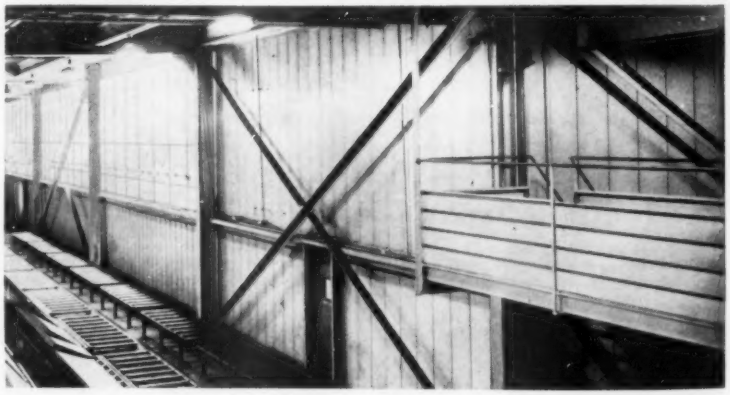
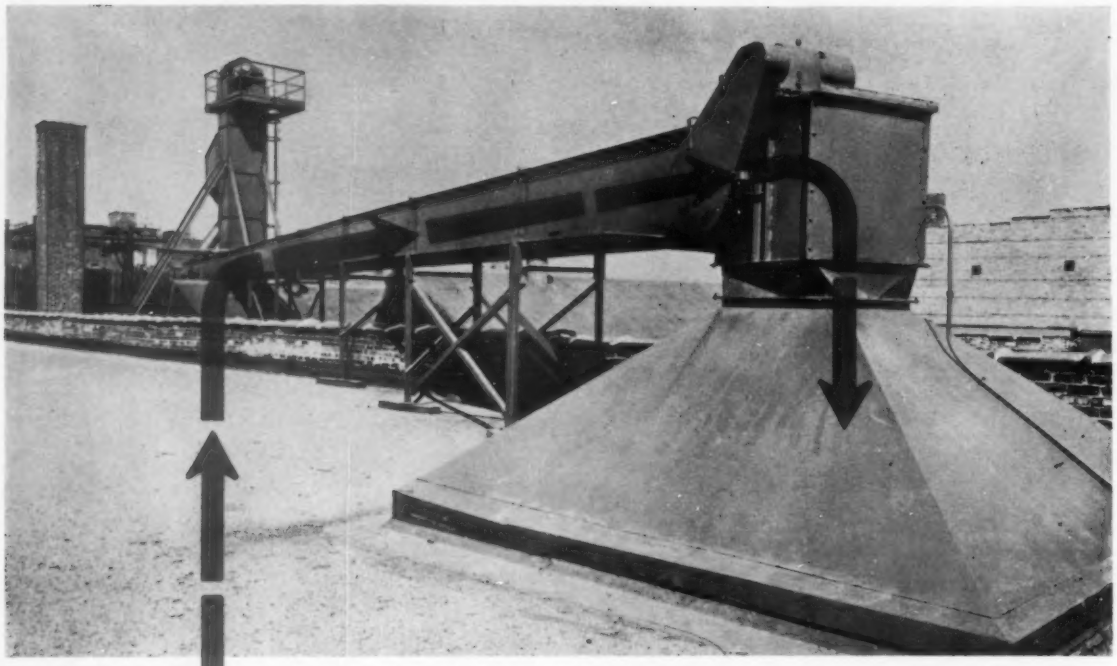


Fig. 4. View of one side of the West Elizabeth plant shows the company-made panelling which was applied to the structural steel skeleton of the building

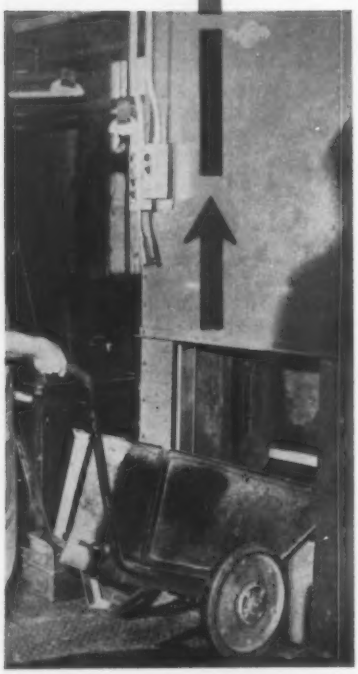
Fig. 5. Everywhere you look in the office area you see the company's products. Cellular panels are also used as air ducts for air conditioning the office section



Enclosed pan-type horizontal conveyor receives chips from skip hoist (in background) and transfers them 100 ft to storage

Production Areas Cleared of Scrap

Conveyor Transfers, Stores Scrap



Operator loads chips into skip hoist, presses button, and chips travel vertically up shaft to horizontal conveyor

AUTOMATIC TRANSFER and storage of metal chips and similar scrap materials is provided in a recently-installed handling system composed of vertical and horizontal conveyors plus a scrap storage bin.

Designed to provide fast, automatic transfer of scrap through non-production plant areas the system thus increases production space and avoids interference with normal plant operations. At its initial installation the new system saved the buyer almost 100 man-days a year in production and transfer time. Built by Gifford-Wood Co., this system also eliminated transfer lines through production areas.

This conveyor system consists of: an automatic, 6 cu ft bucket-type skip hoist conveyor, housed in a special shaft, which conveys scrap vertically from the production area; an enclosed hinged-pan type conveyor for horizontal delivery to the storage bin; and interlocks between the two conveyors, and between the pan conveyor and the bin for necessary transfer, delivery and control.

Scrap is moved from production area to skip hoist shaft, which has a metal door interlocked with the action of the skip hoist conveyor. If the door is open, the conveyor is ready to receive a load. Operator dumps chips into hoist bucket, presses start button on a control panel located beside the shaft.

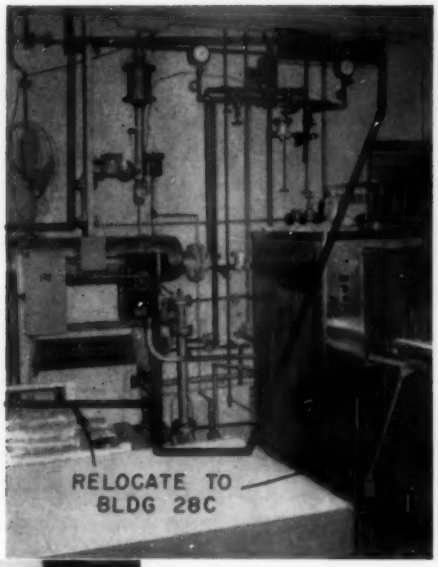
Skip Hoist—Skip hoist moves up the shaft at a speed of 40 fpm. As it reaches the top of the shaft, it automatically tilts to a discharge position and dumps the chips into the hinged-pan conveyor. At the end of a time interval, the skip hoist returns.

Pan Conveyor—The continuous horizontal pan-type conveyor is electrically interlocked with the skip hoist so that its movement begins and ends at the same time as the movement of the skip hoist. It travels at a speed of 50 fpm. After it has poured chips into the storage bin, it continues moving until the skip hoist has returned to its load position and stopped.

Storage Bin—Cylindrical storage bin, normally 25-ton capacity, contains an automatic level sensing device that prevents overloading. When the bin is filled to near capacity, an indicator light is actuated to flash on the control panel beside the skip hoist. This indicates that no more chips should be fed into the system until the bin has been unloaded.

These Pictures Worth 1000 Words

By JOHN M. WALIGORA, Chief Engineer, and
PHILIP G. DAMM, Plant Engineer,
Merck Sharp & Dohme, Philadelphia, Pa.



Camera Provides Quick Specs on Maintenance

MAINTENANCE SUPERVISORS at the Merck Sharp & Dohme plants of Merck & Co., Inc. use Polaroid cameras with flash attachments to take pictures of installations on which changes are to be made.

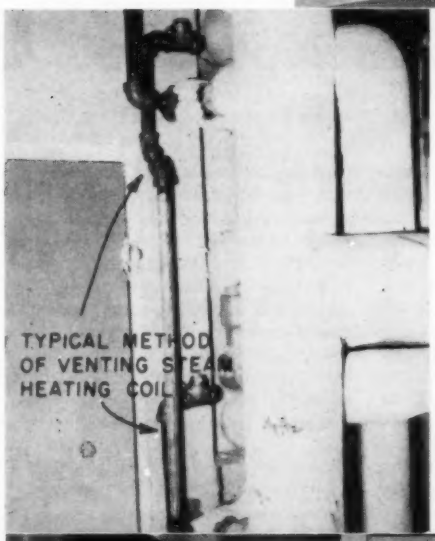
Prints are marked to show work to be done and then attached to job orders. The marked photographs provide a quick way of informing the mechanics of the projects assigned to them without the preparation of a detailed drawing.

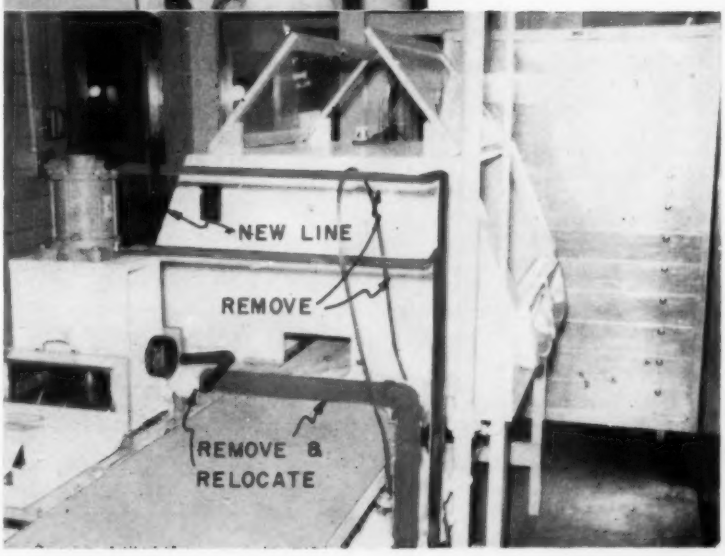
The photograph shows clearly and accurately the extent of the job involved and permits far greater visualization than either a written description or a diagram.

Mechanics and supervisors, who show great enthusiasm about the camera as a maintenance tool, claim that their experience with photography proves the adage that a picture is worth a thousand words.

Training various members of the maintenance staff in photography has not constituted a great problem. Of course, some experimentation is necessary, particularly in regard to composition and lighting.

Normally, it is necessary only to photograph part of an installation or machine, and surfaces which reflect excess light or which throw unwanted shadows are often difficulties which must be solved by a process of trial and error. However, most men become suitably proficient in the use of the camera in a matter of days and soon take excellent photographs.





Pieces of equipment, above, are to be moved and photograph will serve as guide for reconnecting them in new location. At left is a photograph used to illustrate typical method of venting steam heating coils. Below, instructions for relocating piping on sterile filling cabinet are marked on Polaroid photograph

Fig. 1. Appearance of fissures when Teflon is bent denotes structural weakness

Fig. 2. This is the way Teflon should react to

All Teflon Is Not Good Teflon.....

By T. H. I. THIERRY, Manager, Plastics Products, Resistoflex Corp.

MORE AND MORE, plant engineers will be turning to Teflon (tetrafluoroethylene resin) for the answer to high-temperature electrical insulation, corrosion, and abrasion problems.

In the electronics industry, for example, Teflon is being used as a dielectric for coaxial connectors; a big electronics products customer, the U. S. Government, has specified the versatile plastic for most coaxial applications.

In the jet aviation industry, Teflon hose is required to resist high temperatures and pressures and corrosive engine operating conditions inherent in this mode of transportation.

In the chemical industry, Teflon-lined pipes and tanks are used for handling corrosive materials such as hot hydrochloric and nitric acids. Nonadherence properties are being exploited for handling sticky materials.

Unquestionably, Teflon is a member of royalty among the plastics. No other synthetic resin sports a more impressive list of industrially attractive characteristics:

a. Chemical resistance — non-flammable and non-toxic, Teflon is unaffected by most chemicals and solvents (only known exceptions: fluorine and chlorine trifluoride at high temperatures and pressures, and molten alkali metals).

b. Electrical properties—extremely low dielectric constant, low power factor, good dielectric strength, high surface and volume resistivity, non-tracking and zero moisture absorption; each of these properties is constant over a wide range of temperatures and the full range of frequencies.

c. Physical characteristics—thermal resistance (Teflon objects may be maintained in service continuously at temperatures ranging from below —450 to +500 F.); lowest coefficient of friction of any solid material; and indefinite life (Teflon has remained unaffected by years of outdoor exposure.

In hose, tube, rod and sheet, Teflon applications are rapidly expanding. Teflon hose with specially designed fittings, diaphragms for valves, backup rings, bushings, gaskets and washers is used in fields ranging from atomic energy to paint spraying. New applications are constantly being discovered, as plant engineers find once they've installed Teflon they can forget it (it is practically unaffected by anything but normal wear).

There's a Difference?

Some Teflon users mistakenly have come to expect exactly the same characteristics from the resin, no matter who supplies the sheet, rod, or tube. They reason that since DuPont is the sole supplier of resin, all Teflon must be the same.

Their belief is based on the assumption that fabrication techniques cannot possibly affect Teflon characteristics. This assumption is not valid. Teflon fabrication techniques require infinitely more care and are much more intricate than fabrication techniques for other plastics.

Slight variation in techniques and processing control can result in excessive porosity, poor electrical properties, dimensional instability and reduced machineability.

Other complaints have included discoloration, hardness, softness, brittleness, warping, and expansion and contraction. In each case, the difficulty was traced to the conversion process; the fabricator in each case had erred in either sintering, molding, or extruding the Teflon.

As an indication of what can happen through poor fabrication, one plant engineer reported a 25 per cent weight increase in a Teflon part subjected to a fluid immersion test. According to standard data, increase from this test should be 0.0 per cent.

The processing "know-how" — the ability to carefully control fabrication within narrow rates and limits — is essential to develop the optimum properties of Teflon in the fabricated product. Wherever possible, the plant engineer should insist on a written guarantee of Teflon characteristics from the fabricator. These characteristics should not be taken for granted, since quality may vary widely among fabricators.

Teflon powder is compressed into the desired shape at room temperature and at pressures ranging from 1000 to 5000 psi depending on the form. Then it's baked (sintered) at between 700-750 F.

bending. Surface at bend should be smooth

Fig. 3. Penetrant dye applied to surface will render pores in Teflon clearly visible

..Here Are Some Simple Tests for Quality

The sintering process is probably the trickiest part of the fabrication. Although classified as a thermoplastic, Teflon doesn't melt and flow when heated, as do other thermoplastic resins. Instead, the powder remains powder until a temperature is reached (about 620 F) where it becomes a gel. The fabricator must be positive, before starting to sinter, that he's shaped the Teflon exactly the way he wants it, because the gel form cannot be altered without fractures developing.

Adding to the difficulty of sintering is Teflon's low coefficient of heat transfer. Uneven heating near the gel point may strain the piece to the point of cracking. The nature of the cooling cycle after sintering may alter the density.

Sheets, large tubes, and rods over 2 or 3 in. diameter are formed in molds before sintering. Smaller rods and tubes are extruded by compacting the cold powder and forcing it through a heated die, where it is sintered.

If an extrusion aid is used, the Teflon resin must pass a 4-mesh screen before blending. If the resin is overworked—by shaking the screen too long, for example, or even by scooping instead of pouring the screened powder — density, and consequently physical, chemical and electrical characteristics of the product, can be drastically altered.

Plant engineers usually have neither the time nor the laboratory facilities for rigorously testing Teflon as it is received from the fabricator. A few simple, quick tests are available, however, which do not require special or expensive equipment. If for nothing more than his own peace of mind, the plant engineer should have some yardstick to measure Teflon quality; after all, it isn't exactly the cheapest material on the market.

Four quick, qualitative tests for field use have been formulated by our company's engineers: visual inspection, bend test, penetrant-dye examination and spark test.

Snow-white Teflon is of course the most desirable from a visual standpoint. If spots are present, distinguish between characteristic color variations in the resin and contamination. Fuzzy spots ranging in intensity from gray to black and from tan to brown frequently worry the plant engineers—needlessly.

These discolorations were present as reaction products in the resin as received by the fabricator; they have been proved to have absolutely no effect on either physical, chemical, or electrical characteristics of Teflon. Of course, metal specks or other foreign matter in the fabricated material are

Fig. 4. Appearance of fissures, or even ruptures, denotes a structural weakness

Fig. 5. Industrial applications of Teflon are many. Arrow points to metal-covered Teflon hose used on a cementer machine

obvious defects which can alter its characteristics.

Bend Test: The bend test detects structural defects such as cracks and poor bonding. In this test, a length of rod, sheet, or tube is bent around a mandrel. The mandrel used should have a diameter 1½ times the rod diameter—up to a rod diameter of ⅝ in. For rod diameters from ⅝ in. to 1 in., the mandrel diameter should be 3 times the rod diameter. The bent Teflon should show no breaks or fissures, or signs of potential cracking. The surface of the bend should be smooth and continuous.

Dye Test: The dye test checks porosity on both exterior and interior surfaces. For exterior surfaces, use a solvent cleaner to remove grease (allow five minutes for drying). For interior surfaces use a hack saw or slow-speed band saw to cut into the sample piece; avoid chopping with the saw—this will cause a false indication of high porosity. Sand the Teflon's surface to eliminate chop marks, if necessary.

Next, hold surface horizontally and apply a penetrating dye (for example, "Spotcheck"—a product of the Magnaflux Corp.) Allow the dye to stand for at least fifteen minutes; during this time if the penetrant is dry, re-wet the surface and wait five more minutes. Then wipe off the excess dye. If the Teflon is porous, the absorbed dye will render the pores clearly visible. Porosity has been proved to alter electrical characteristics.

Spark Test: Spark testing will reveal pinholes and porosity. Several spark-testers are made commercially; this test should be made with a supply voltage of approximately 10,000 volts, or sufficient voltage to produce a ¾ in. spark in air. Pass the charged point of the tester over the surface of the Teflon: spark jump will betray the presence of pinholes or porosity not discernable by visual inspection.

Helping the Fabricator

It is advisable for the plant engineer to confer with the fabricator before reaching the specification stage. In this way he will be able to make full use of the properties and best fabricating characteristics of Teflon for his particular design problem. Dimensional tolerances, for example, are frequently specified unnecessarily tight; Teflon has a rather high coefficient of thermal expansion. Admittedly, these tolerances are sometimes unavoidable. Often, however, the specifications are carry-overs from the time when the object was fabricated from metal—and they can be altered.

In some industries (for example, food and beverage) cleanliness is extremely important. Naturally discolored objects are often replaced with colorless materials merely to dispel the psychological implication of uncleanliness.

In these industries engineers may desire snow-white Teflon. Discolored material can frequently be bleached out but, here, as implied previously, the engineer should be certain the fabricator knows what he's doing. Some bleaching techniques alter Teflon's density; a porous structure may result, affecting its electrical properties.

Hose jacketed with stainless steel braiding and laminated pipe reinforced with glass fabric are particularly popular. Operating conditions of 1000 psi at +450 F have been employed with the hose—with practically no effect on the hose. Hose sizes are available from ¼ in. to 1¼ in. I.D.

Fracture-proof laminated pipe is available from 1 in. to 4 in. inside diameter. Burst pressures range from 400 psi (4-inch) to 1600 psi (1-inch). Fittings such as elbows, reducers, and adaptors are readily available.

Thick and thin-walled tube without reinforcement is also available in a variety of sizes. For thick-walled cylinders (and rods), the plant engineer should insist on either examining the fabricator's X-ray data personally, or obtaining a written guarantee that the Teflon is free from internal voids, cracks or other defects.

Additives Perk Up Residual Fuels

Case Histories Report the Successful Use of These Additives

By HARRIS THOMPSON, Assistant Vice President, National Aluminate Corp., Chicago, Illinois

RESIDUAL OIL is a relatively inexpensive fuel, frequently selling at a price lower than crude oil. It performs a very useful service to both the refiner and the consumer by disposing of the combustible by-products of refining at a favorable user price. In the early days, it came almost entirely from the straight run distillation of the crude. Today, it is usually composed of the heavy ends from many refinery processes.

The three grades of industrial residual fuel are Nos. 4, 5, and 6. Number 4 is a distillate-residual blend, usually of Nos. 2, 5, and 6 for burners equipped with preheating facilities. Numbers 5 and 6 are black residual oils, although No. 5 is frequently blended to meet with specifications.

Present day residual oils have the advantages of a higher carbon to hydrogen ratio, lower API gravity and higher btu content per gallon. However, they give problems in some cases as they may tend to form sludge and water emulsions, and/or to burn with a smoky flame unless burner and furnace conditions are carefully adjusted. Examination of these problems led to the study of chemical additives as a means of improved operating results.

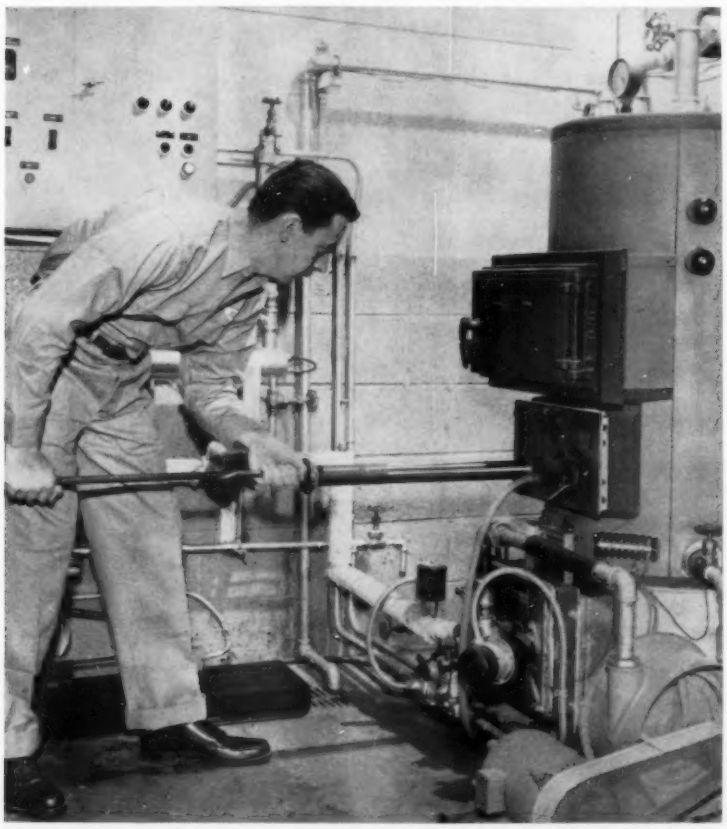
Many of the causes of troubles experienced in the use of residual fuel do not exist in the fuel as manufactured, but develop after aging, storing or further contaminating with water. Fresh residual fuel as manufactured contains only a very small amount of sludge and water. If present they are thoroughly and uniformly dispersed. This causes little or no trouble when burned immediately.

However, when the fuel stands in tanks the original sludge gradually settles out and frequently additional new sludge forms from the unstable oil components, adding to the settled sludge deposit and using up valuable tank storage space.

The oil may be contaminated with water from normal tank breathing and condensation, from leaking steam heater lines or from other sources. This may form objectionable viscous water-oil-sludge emulsions, usually in non-uniform sticky masses, using up tank storage space, causing plugging of suction lines, filters, screens and burner nozzles or spitting, sputtering "sparkler" burner operation.

The ash and sulfur content, the carbon-hydrogen ratio, the carbon residue, and the viscosity range are inherent characteristics of the fuel as manufactured. The trend of refining operations and of economics in the past has made it unavoidable that all of these characteristics of the residual fuel have gradually increased. However, these changes have been slow enough so that mechanical changes in handling and pre-heating design of installations and the use of chemical additives has permitted continued expansion of residual fuel use.

Fig. 1. Laboratory furnace for test firings of treated and untreated fuels



General Trouble Categories

An additive for residual fuel in a very broad sense is a chemical or blend of chemicals designed to help the operator maintain continuous and uninterrupted trouble-free operation in his fuel use. It is a material which either gets the operator out of trouble or prevents him trouble.

Referring to the chart, Fig. 2, the use-troubles are of two main areas, those which occur in the storage tank, lines, filters, heaters and burner mechanism, and those which occur in the flame and on the walls of the furnace. Therefore, a specific chemical additive must be designed to act in one or both of these areas in order to correctly solve the user's problems.

The properties of a good additive have been enumerated by several authors. These properties all have to

TYPE OF PROBLEM	USE LOCATION OF TROUBLE					
	STORAGE TANKS	SCREENS AND FILTER	HEATERS	BURNERS	FLAME	FIRESIDE OF BOILER OR STACK
SLUDGE SETTLING	X		X			
SLUDGE AND VARNISH FORMATION	X	X	X	X		
OBJECTIONABLE WATER—OIL SLUDGE EMULSIONS	X	X	X	X	X	
SOOT					X	X
SMOKE					X	X
SLAG						X
CORROSION	X					X

Fig. 2. Types of problems and where encountered are shown in chart above

do with the preburner performance. It is generally agreed that an additive should:

1. Be simple and safe to use; non explosive, non toxic, non corrosive, non evaporating, not objectionable in odor.
2. Be completely soluble in fuel oil.
3. Have surface activity with dispersant, detergent and emusifying action.
4. Maintain its effectiveness in the presence of water.

It has been said that an additive should have a specific gravity equal to or heavier than water so it would drop to the bottom of the storage tank and act on the sludge. Our experience indicates this is not necessary. The best results on a tough problem of tank bottom sludge are obtained with additive application on a pumped-down tank, with agitation. Subsequent dilution with additional fuel disperses the sludge in a burnable condition. It is common to apply treatment just before a tank is refilled so that good mixing is obtained.

It has also been said that a good additive must have very high solvent power. Our experience indicates instead that the additive must be a powerful dispersant with solvent power being much less important. It must have surface activity to disperse and keep sludge in suspension in the fuel; it must thoroughly and uniformly disperse small amounts of water, releasing the remainder of the water from emulsion and allowing it to separate cleanly so it can be drawn off without oil loss.

We have examined a great many samples of sludge and have found them almost universally insoluble, even in a concentrated additive of a solvent type. Obviously, solvent action of an additive is very much less at the operating dosage of treatment (usually one to four quarts per thousand gallons) than when tested in concentrated form.

An additive must stabilize the fuel and prevent new sludge formation in storage or in heating. This can be accomplished by antioxidant and anti-polymerant action of the additive ingredients.

An additive should help prevent soot and smoke in two ways. First, its stabilizing and dispersant action should keep the burner free from deposits of varnish or sludge, and thoroughly emulsify small amounts of water so they do not cause sparking and sputtering. Second, it should contain a specific combustion catalyst to lower the ignition temperature of soot and promote clean burning of the aromatic (high carbon-to-hydrogen ratio) compounds in the fuel.

Slag (inorganic) deposits in the furnace are due to the ash and sulfur content of the fuel. Additives have been developed to handle these conditions. However, they are usually dry powders (not oil-soluble) fed as a concentrated oil-emulsified-slurry by positive displacement pump directly to the oil going to the burner. It would be desirable to have these slag prevention additives in concentrated liquid oil soluble form. Up to the present time, however, this form has been too expensive.

Additive dosages are usually between one pint and one gallon per thousand gallons of fuel and costs range from $0.50 to $2.50 per thousand gallons of fuel. The costs vary with the type and severity of the problem. When the preburner problems of sludge are the major consideration the costs of chemical additive are at a minimum.

Soot Ignition Temperature

Combustion action of an additive in lowering the ignition temperature of soot is measured by an apparatus designed by our laboratory personnel. See Figs. 3 and 4. The principle of operation is very simple. A fresh piece of aluminum foil is wrapped on the foil holder and sooted in a suitable flame. A No. 2 oil solution or finely divided oil suspension of the material to be tested is sprayed on the soot and the holder is placed in the heater where it is heated at a uniform rate until the soot disappears. The temperature at which the foil is first visible through the soot around the thermocouple junction is recorded as the soot ignition temperature. The instrument is called a Sootometer.

Field use of treatments is proof of their value. As case histories are of interest to most users, the following four are presented to show results which have been obtained.

The product development director for one of the major oil companies distributed a report to his division offices covering the test use of additive for disposing of accumulated sludge in the bottom of a heavy fuel oil tank. Excerpts are quoted from his report.

"A 59,000-bbl tank in No. 6 fuel oil service was treated with 110 gal of additive. It was applied directly to sludge in the pumped down tank just prior to refilling. From the first treatment, the viscosity of the bottom sludge (6 in. of thick sludge at start) was lowered appreciably and after three treatments it was reduced to a pumpable material which could be mixed with the incoming No. 6 fuel oil without throwing it off specification. A large quantity of water and some sediment was broken out of the original sludge layer as a result of the treatment, and this was disposed of without difficulty.

"The treatment took less time and less treating agent was required than estimated originally by the additive

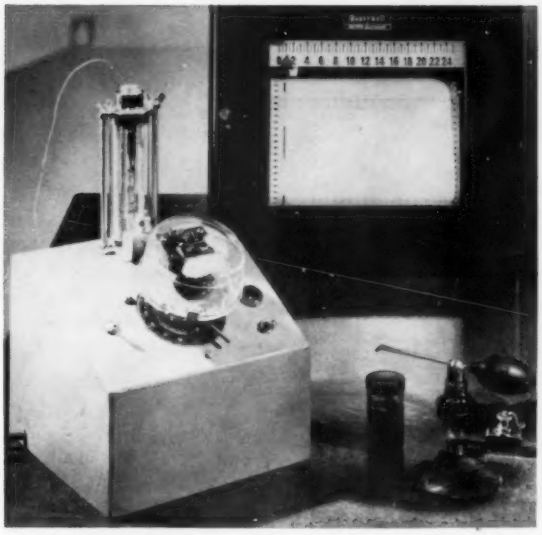


Fig. 3. Sootometer measures the ignition temperature of soot

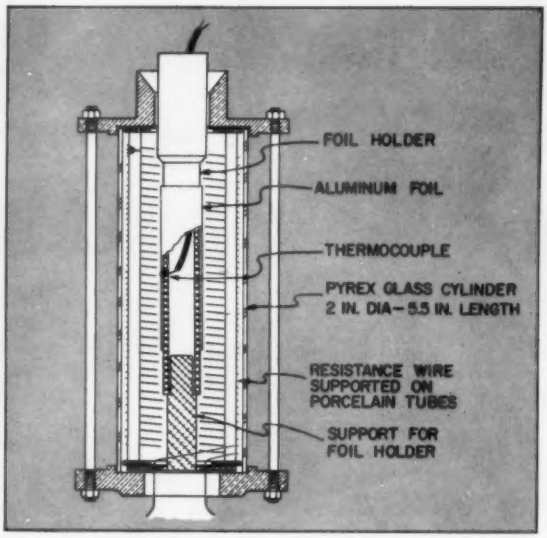


Fig. 4. Details of the meter show positions of components

manufacturer. The tank was never out of service and the combustible portion of the sludge was converted to salable fuel oil instead of being wasted . . .

"Conventional cleaning methods take the tank out of service for two weeks or more. A 55,000-bbl tank at this plant was cleaned by shovel and wheelbarrow in 1945. The tank was out of service for 75 days, disposal of the sludge was difficult, and the operation was very expensive.

"This report shows that the use of chemical additive successfully removed the sludge in a relatively short time, at moderate cost, and converted a large portion of it to marketable fuel oil, instead of creating a disposal problem for the heavy material."

Additive Effects Savings

The following is another case history abstract pertaining to sludge removal from an oil storage tank with the use of an additive:

"A large user of residual oil in Florida has a 34,917-bbl tank. Each new barge load filling contains 3,500 bbl of oil. They pumped the tank down somewhat before starting treatment. They started feeding additive in dosage of one pint per 1,000 gal fuel oil. Then they fed it by pouring it into the tank at the same place and time as they were pumping in new oil. Of course, the method of feeding was not the best. However, we decided to see what would happen.

"The sludge was measured before treatment and again after they had used three drums of additive. Average sludge depth calculated from individual measurements at start was 33 in. and average depth at the end was calculated to be 19 in. This showed that 42.4 per cent of the sludge had been reclaimed.

"This amounted to a reclamation of 2,045 barrels of oil. At $2.28 per barrel, this amounted to $4,662.60. The three drums of additive cost them approximately $404.25, excluding freight. This means that they actually saved $4,258.35. This does not include any estimate on savings by eliminating tank outage, disposal problems, or labor that would have been required to manually remove the sludge. During the test period, they experienced no difficulties at all in burning the oil and sludge mixture."

Strainer Cleaning Reduced

A plant in the Chicago area was burning a good grade of No. 6 residual fuel oil, high in BS&W (Bottom sediment and water). Before treatment of the oil with additive, it was necessary to clean the fuel oil strainers at the burner twice daily to maintain sufficient flow. Sediment up to ⅛ in. thick was found in the strainers at each cleaning and the burners were badly fouled by carbon deposits.

Treatment of the fuel, using an additive dosage of one quart per 1,000 gal, was started and immediate improvement was noted. This resulted in strainers being cleaned only once every third day. The accumulation found was not only less bulky, but could be easily washed out whereas it was formerly necessary to scrape the strainer prior to washing. The burners were operated for longer periods with only minor carbon build-up that was easily rinsed off.

The Chief Engineer of a plant in northeastern United States evaluated the results he was obtaining with additive. Following is a short abstract of his evaluation.

"Boiler 1 went into service on November 23, 1953 and Boiler 2 went into service on December 16, 1953. When these boilers were placed in service, no fuel oil treatment was used by the station. The design of these boilers is such that in order to inspect the fireside of the boiler tubing it is necessary to remove furnace wall brick. This is practical only during the annual boiler overhauls in the summer months. Because of the impracticability of inspection, the fact that untreated oil was causing serious soot deposits on the boiler tubing was not discovered until the forced outage of Boiler 2 on April 22, 1954. Because of station loads, it was not possible to do any boiler cleaning at the time. Instead, the treatment of fuel oil with a combustion catalyst additive was started.

Clean Boiler Tube Surfaces

"Treatment was maintained until the end of the 1953-54 heating season. When these boilers were overhauled at the end of the season, it was found that the heavy soot deposits found in April had burned off leaving very clean boiler tube surfaces.

"Since the use of additive had proved so successful during the latter part of the 1953-54 heating season, it was continued throughout the 1954-55 heating season. During this period, Boiler 3 was placed in service on November 8, 1954. No inspection of the firesides of the boiler tubing in any of the three boilers was made during the season. When given their annual overhaul in 1955, each was found to be exceptionally clean."

Fig 1. Fixed-route system is one good way to cut the costs of deadheading

Fig. 2. Driver training in safety practices is necessary to cut down accidents

Industrial Truck Costs—
What They Are and How to Lower Them

By L. C. HOPPER, Elwell-Parker Electric Co., Cleveland

TWO IMPORTANT questions currently loom before cost-conscious plant engineers: 1. what makes up operating costs of industrial trucks, and 2. what to do about lowering them. While more and more companies are utilizing powered industrial trucks to increase handling efficiency and lower overall production costs, far fewer firms can accurately measure the cost of operating these vehicles, or realize the additional savings which can be made by more efficient operation.

In presenting factors for consideration in computing the true cost of truck operation, this report attempts to cover every conceivable factor which has a bearing on such costs. It must be noted, however, that to make such a program a success, accurate record keeping is vital, since records of cost factors provide the only means of determining what corrective action to take. On the subject of records, it should also be noted that factors used should fall in line with normal accounting methods of a given company.

How to Figure Costs

The two tables, contained on these pages, present major factors to be considered in figuring both the cost of truck ownership and the cost of truck operation. Important among factors contributing to truck ownership are the installation costs for such equipment. For example, if a decision is to be made between the specifying of a conveyorized handling system as opposed to a fleet of industrial trucks, the cost of installing the two systems should be noted in the cost of ownership. Factors relating to the rest of truck ownership are shown in Table I.

These tables also point out that only proportional charges should be levied against certain equipment or departments where they have a bearing on other plant facilities or operations in addition to industrial trucks. This is most important in an accurate analysis of truck ownership costs, since a maintenance department, which services the trucks, may also be assigned maintenance jobs for other equipment.

Why Keep Operating Costs?

Within the realm of truck operation, even the smallest factors should be noted because collectively, and over a period of time, they account for a substantial consideration. For example, it is quite common to figure gasoline as a cost of operating gasoline trucks. Yet, many firms overlook the cost of electricity in supplying current for charging battery-operated trucks. Factors relating to the cost of truck operation are shown in Table II.

Of necessity, considerable time and effort must be expended in the computing and recording of operating charges for industrial trucks (it is far easier to figure the cost of truck ownership). Accordingly, the reasons behind the keeping of such costs are often questioned, as are the specific advantages thereof.

In the first place, the recording of these costs makes possible the comparison of truck handling to alternate handling systems (the same may be

Table I. These six factors must be considered in computing cost of ownership

Cost of Ownership Factor	Remarks
1. Original Cost of Truck	
2. Allowance for Yearly Charge-Off	For Gas Trucks—7 years; For Electric Truck—12 to 15 years.
3. Cost of Accessory Equipment	Batteries, spare batteries, charging equipment, gasoline storage facilities, pumps, oil storage facilities, etc.
4. Cost of Maintenance Department	Lubrication equipment, lifts, tools, tire presses, etc. Note: where the same maintenance department is used for other plant equipment, only a proportional charge should be levied against truck operation.
5. Initial Cost of Equipment Facilities	Where such equipment is used for other purposes, safety or plant protection for example, only a proportional charge should be levied against truck operation.
6. Cost of Pallets, Skids, Containers	Where such equipment, is used with other handling equipment, only a proportional charge should be levied against truck operation.

said of an evaluation of other types of material handling systems as well). But it is most important that such an analysis be completely impartial if the advantages of such a study be obtained.

Secondly, such figures are a great aid in deciding when to replace existing handling equipment. Some companies are guilty of failing to review costs periodically. It may be that a given handling system that was proven the most economical and efficient at one time, has in terms of changing plant operations, the introduction of new types or variations of equipment, become less desirable. For that reason, evaluation of existing handling systems is of as much importance to long time users of such equipment as it is to prospective purchasers.

Certainly, in light of a study of existing equipment, an entirely new system is not always indicated. For example, a company may find that the handling of 2000-lb loads with industrial trucks is uneconomical only in terms of combining loads where it is found to be more efficient and more economical to handle 4000-lb loads, and decrease the number of handlings. Or, a given industrial truck can be altered with the addition of one of many attachments, to handle new types of loads that were not a consideration when the truck was originally purchased.

A third reason for keeping operating costs is that they become a factor in computing overall plant operating costs as a means of pricing a finished product (or service in the case of warehousing or other such operations). Certainly when computing the cost of placing a new product into production, in addition to dies, new machine tools, increased labor, and the like, the cost of handling the product during production as well as other phases, must be considered.

Fourth, such figures provide a means of overall economizing within the plant. When it is known precisely where certain costs exist, a more direct approach to minimizing such expenses is possible.

And finally, in the case of industrial trucks specifically, such figures are often a positive means of determining which type of industrial truck, fork, platform, walkie, etc., should be specified for a given handling job or jobs.

With the complete facts and figures available on both the cost of owning and operating powered industrial trucks, what then are the steps to be taken to reduce these costs.

Important among the areas of consideration is to make sure that a company buys the best equipment possible, best suited to its specific requirements. Most firms today no longer consider the "buy-cheap-and-junk-in-time" philosophy as the by-law of successful operation. Today, most progressive companies realize that it is best and more economical to pay a higher price for finer equipment that will do a better job, cost less to maintain, and give better and longer service life.

The same care in purchasing the finest and best suited industrial truck also holds true for pallets, skids, and other containers as well. Again, a better quality load carrier will return its original investment price many times over.

Preventive Maintenance

One of the most important factors in reducing truck operating costs, is the establishment of an effective preventive maintenance program. This is true because through preventive maintenance, many minor troubles can be caught in time, eliminating subsequent costly failures or breakdowns. And the training of truck operators to spot such warning signs is vital to the success of the overall program. Regularly scheduled inspections and lubrications are also a must to effective preventive maintenance, and all truck manufacturers offer suggested time intervals to perform specific inspection functions, lubrication operations and the like.

In addition, proper records of maintenance functions go a long way towards insuring effective preventive maintenance, likewise aid in the ordering and stocking of spare parts which

Fig. 3. Racks, pallets, skids must be considered a part of truck ownership costs

are thus available, in the proper quantities, when needed.

Such records can also provide clues to a consistent trouble spot which when eliminated, can sharply decrease truck repair, and of course lower operating costs. For example, one company noted recurring axle damage to several of its trucks which operated in the plant yard. This factor, which came to its attention through a study of maintenance records, was traced to a rutted crossing at a rail spur over which these specific trucks traveled many times each day. Repair of this crossing completely solved the problem, an important cost savings to the company.

Actual repair work is likewise important in minimizing truck operating costs. Personnel should be thoroughly trained in their duties, high quality parts should be used, and an intelligent approach as to when to replace existing parts, are all essential to a correct repair program.

Operating training, as already indicated, is vitally important in keeping trucks on the go, at the lowest possible cost. More and more companies are setting up formal driver training schools; other companies have insisted on less rigorous, yet effective driver training programs, which present actual courses that prospective truck operators must pass before they are allowed to start on the job.

Whatever the scope of such a program, there is no doubt that some form of education is necessary to make sure operators handle trucks effectively, safely, and with care for their loads, and the property around them, and their fellow workers.

Direct cost savings are often traceable to such a program in terms of the reduction of accidents and the accompanying expense in damaged loads, trucks and other equipment, plus compensation claims arising out of injury to personnel.

Truck Scheduling

One of the greatest non-productive costs in truck operation stems from poor scheduling of the vehicles themselves. This results in excessive travel without payloads, (dead-heading). It has been found that in the average company, only 60 per cent usage is obtained from industrial trucks. When a concentrated effort is made to improve scheduling methods, up to 90 per cent usage has been achieved.

Several methods may be utilized to determine actual usage of trucks. The first consists of the use of operational recorders which measure the amount of time the truck is in motion, with and without a load. Another way is to have operators keep an actual log of trips made, where loads were handled, etc. In any event, it is most important to review records, either mechanical or manually recorded, to ascertain where improvements can be made to up truck usage, minimize dead-heading.

With such information on hand, improved scheduling may result from the use of written orders, a light system for signalling trucks, the use of two-way radios, and other such methods and equipment. Some companies find that a fixed route system is the best way to eliminate dead-heading; others find that fixed area assignments is the best way.

A fixed route system involves the setting up of specific routes of travel for powered rolling equipment, most often tractor-trailer trains, usually operating on precise time schedules between departments. Such systems are not unlike public transportation systems where vehicles operate over a given route, stopping to discharge and pick up loads. With such equipment providing the chief means of interdepartmental transportation, additional equipment is required only to transfer goods to and from nearby work stations and the pick-up or discharge point of the long range operating vehicles.

Fixed area handling involves laying out a plant according to prescribed areas, determining which equipment shall operate within these areas, and noting that no equipment shall travel outside these limits. Such a system is sometimes supplemented with several trucks which can take care of emergency or certain prescribed inter-area moves, but by and large, the majority of the vehicles operate locally, eliminating excessive dead-heading, reducing the length of individual moves.

In total, there is no question, however, that intelligent planning and proper schedules can save untold numbers of dollars in inefficient truck operation.

Finally, many firms have found that increased truck effectiveness can be obtained, in addition to proper scheduling, by having operators work on an incentive system on the basis of the type of loads handled.

Table II. These ten factors effect the cost of operating powered industrial trucks

Cost of Operation Factor	Remarks
1. Gas or Electricity	Figured at bulk rate at which company purchases it.
2. Oils, Lubricants, Hydraulic Fluids	
3. Operator(s) Wages, Wages of Their Supervision, Plus a 25% Increase for Fringe Benefits	Annual wages for industrial truck operators range from $3600 to $4200 per year.
4. Maintenance Cost of Pallets, Skids, Containers	With pallets for example, approximately 18% of the original investment per pallet should be allowed for annual maintenance.
5. General Truck Maintenance—Preventive and Repair	
6. Wages of Maintenance Personnel, Wages of Their Supervisors, Plus a 25% Increase for Fringe Benefits	Where maintenance personnel perform functions for other equipment, only a proportional charge should be levied against truck operation.
7. Cost of Spare Parts Plus Materials and Supplies Used	
8. Cost of Operator Training Plus Materials and Supplies Used	
9. Cost for Specialized Equipment for Safe Operation of Trucks	Truck and load guards, warning lights, etc. Note: In some companies, such equipment may be charged to a plant's safety budget.
10. Overall Cost of Plant Overhead, Taxes, Insurance, Interest on Investment, etc.	

An outstandingly successful industrial park is this one at Kansas City, the Fairfax Industrial District

The Case for the Industrial Park

By GEORGE W. WARNECKE, President, George W. Warnecke & Co., Inc.

FROM THE PLANT engineer's standpoint, there are several advantages to be gained from recommending plant location in an industrial park. Engineers and architects who design plants that are to be located in a community of industries endeavor at the outset to make plans for buildings which are as unspecialized as possible.

It may sound as though such a procedure would result in nonconformity with industries which need facilities designed for specific uses. Hence the use of the term "as possible" above. It has been found in the past that narrow concepts of usability have made plants so restricted in their adaptability that it was impossible to remodel them when operations on the part of a specific user changed or expanded.

By adhering to this "most unspecialized design" policy, it has been possible to keep rental costs down for buildings located in industrial parks. Rates range from 44 cents to $1.25 per sq ft, with the average generally falling into the 50 to 80 cent range.

Because of this policy and because buildings of almost any design can be built, the plant engineer has virtually unrestricted latitudes in specifying floor construction, clear-span floor areas and floor loading. Floor construction ranges from simple, pre-laid types to piled floors, depending on specific load factors. Bays average from 25 to 50 ft.

Plant engineers who are interested in investigating industrial park location would have extensive latitudes in suggesting their own ideas and requirements for specific construction and layout needs. They would, of course, have to be consistent with the requirements of the development itself, and the restrictions imposed by the owners of the park and local planning and zoning officials. These, however, are known ahead of time and no park is planned without the owner being able to set forth clearly which plants would be acceptable.

This means that any of the plant engineers' ideas could be incorporated consistently with these foreordained restrictions. It can readily be seen that a specific park would be designed to accommodate certain types of industries and that any suitable industries could have erected for them practically any type of facility needed.

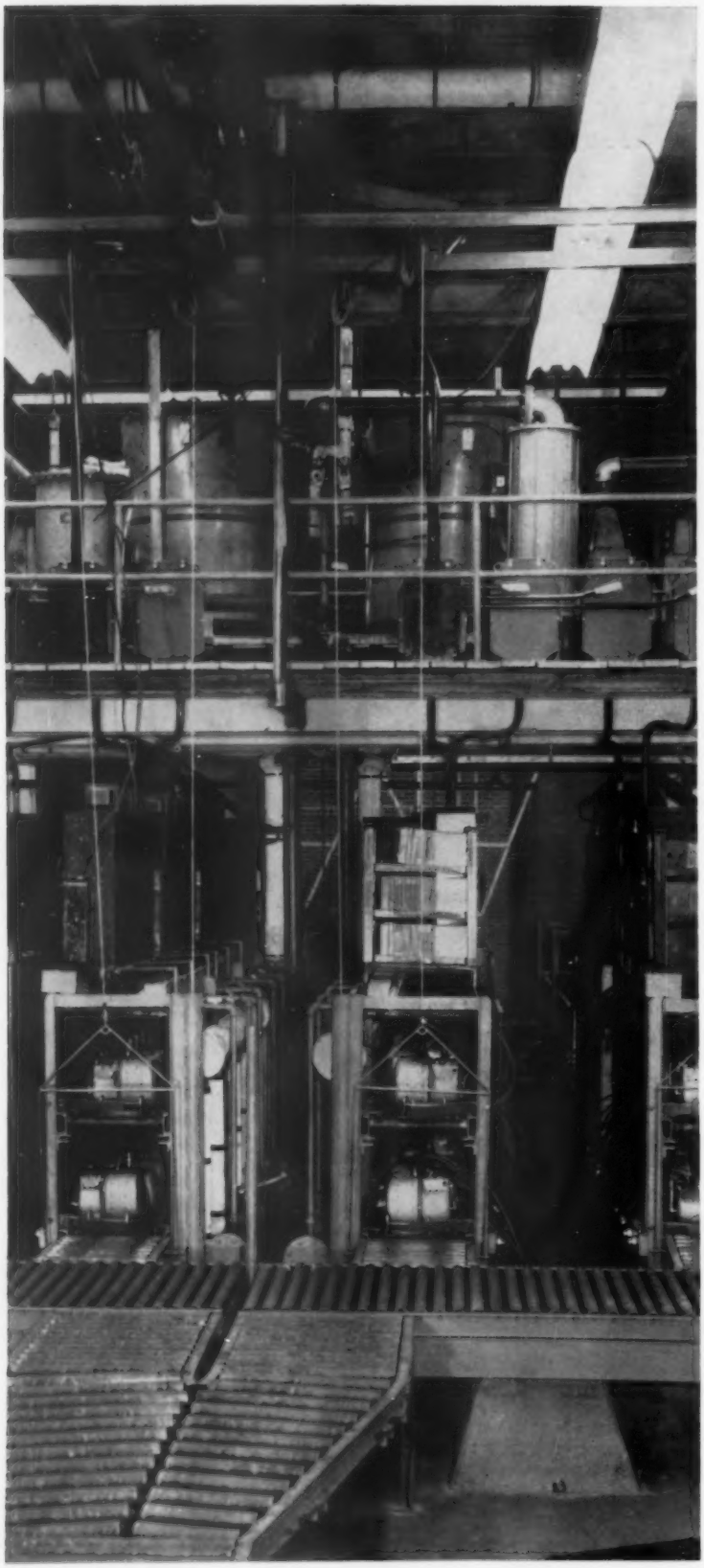
A good industrial park is always located near adequate sources of electric power. Power rates in these circumstances are cheaper per plant where several plants are in a group, than rates would be to an individually located plant. Then, too, power rates are almost always negotiable, meaning that the suppliers of power are amenable to discussion of rates when it can be shown that lower fees will mean that more power will be used. Transformers would be provided before plants move in so that adequate voltages would be made available.

The same would hold true of illuminating gas and water as is the case with electrical power. These commodities would be cheaper per plant than for a plant located by itself of such an industrial community. In these instances, too, rates are negotiable.

Zoning would definitely be no problem to a plant whose management feels that it should locate in a certain industrial park. The reason for this is that each park is designed for certain types of industries and those industries which would violate zoning laws would not be admitted to a certain park. This does not really mean undue restriction since there are parks planned for every type of industry.

In line with the above, there would be no "second class" citizens of the parks. Because a certain park is set

(Continued on page 230)



When Is DRY

AIR AS IT COMES from the compressor is normally wet. To the jackhammer, jolter or hoist this probably doesn't matter, except for a few rusted cylinders after a weekend shutdown. Or to the workman way out on the line, unless you count as lost the ten to fifteen minutes he has to wait while the water that condensed in the pipes because the temperature dropped last night, drains from the line.

"But we have an aftercooler and separator on our compressor which catches that water," you say. Let's check and see how dry these devices actually get your air.

The amount of water in compressed air depends to a great extent on its temperature. For example, a flow of 200 cfm of air at 100 psi carries almost 14 lb of water vapor per hour into the aftercooler. If the aftercooler can drop the temperature of the air to 90 F., then over 10 lb of this water is condensed, leaving about 3.3 lb per hour of water vapor in the air.

With a good mechanical separator, substantially all the *liquid* water can be eliminated from the system, but still leaving that 3.3 lb of water vapor, which can be a troublemaker. Any time the temperature of the air is dropped below 90 F., that vapor condenses to form more water.

Today, many of industry's tools and methods have developed to such a fine point that they simply cannot tolerate this hazard. On many tasks, the air must be dried to a dewpoint well below the lowest temperatures that will ever be encountered on that job. Where lines are completely indoors in heated areas, it may be sufficient to dry the air to a somewhat higher dewpoint. But each case must be considered individually and factors of safety allowed as demonstrated by these typical cases.

For General Plant Air: The degree of dryness obtained with aftercoolers, where cold water is available, is low enough for the majority of applications of air in a manufacturing plant. The dryness obtainable with special dryers cannot always be eco-

Fig. 1. On this refrigerator inspection rack every refrigeration component is charged with air at 250 psi that has been dried to —70 F to prevent rust

Compressed Air Worth What It Costs?

By GEORGE L. SIMPSON, Vice-President, Gen'l Manager, Pittsburgh Lectrodryer Corp.

nomically justified for general plant use. Many companies pipe two kinds of compressed air around their plants, with special colored piping clearly indicating this fact.

Refrigeration equipment manufacturers, Fig. 1, and service organizations blow out tubing and break the vacuum on compressor and expansion units with really DRY air. When units are pressure-tested for leaks under water, this DRY air is employed. All this care combines to make certain there'll be no moisture in the system to cause freeze-ups in service.

One maker of fine watches uses air jets to keep cutting tools free of chips. Stains that developed on polished and plated surfaces were traced to moisture in the compressed air. A drier was installed to feed DRY air to the machine tools and the staining stopped. The chart reproduced here, Table I, shows how quickly moisture showed up in the lines when the drier was accidentally disconnected; the machine operators' complaints quickly got the drier back into service.

Astonishing savings were reported recently by the builder of mechanically-actuated electronic equipment. These devices must be operated thousands of times in the factory at —60 F before being accepted by the USAF. Premium grade, extremely dry nitrogen was purchased at 70 cents per cubic foot and as many as seven bottles were used to test a single unit. Now a small drier, taking air from the plant line, dries the air to below —70 F, saving its cost many times every month.

On Metallurgical Work: Oxygen, hydrogen and various inert gases have long been used in heat treating, sintering and other metallurgical operations. Dryness is often required there, to a degree beyond that supplied by the gas producer, so a drier is installed for that purpose. Newest process, though, is the use of DRY air for blowing molten steel to eliminate hydrogen bubbles in the finished metal —a job previously assigned to oxygen. Here, too, drying is required as moisture in this air would break down into hydrogen and oxygen, thereby defeating the purpose of the blowing operation. Ordinary compressed air from the plant line is dried on-the-job near the furnaces served. Figure 2 shows an application wherein television tubes are dried over air jets.

Instrument Air: Automation in the process industries depends largely on air for transmitting performance data to the central control room and then for transforming that information into action. Air motors on valves and other devices adjust flow and temperatures to keep the process on the beam. Miles of tiny tubing may extend all over a petroleum refinery, a chemical plant, power or sewage treatment plant. They form the nerve system which detects every deviation from normal and corrects for it. There can be no moisture in those air lines to cause freeze-ups if the temperature drops, to form rust or combine with dust to form mud that will clog delicate instrument parts. Dependability demands clean, dry instrument air. Figure 3 shows air-operated valves in a pumping station; the air used has been rendered DRY by a small dryer.

The quantity of compressed air used in instrumentation can vary considerably—a few cubic feet per hour at the pumping station for a cross-country gas pipe line, or hundreds of cubic feet for the refinery whose controls are fed from a central compressor in

Fig. 2. Many hours of manufacturing time are saved on this line where television picture tubes are dried over dry-air jets

Table I. This shows how moisture in the compressed air jumped from minus 50 C to plus 4 C when the drier on the compressed air line was taken out of service

Date	Department	Dew Point	Grains per Cubic Foot	Remarks
4/20	Bal. & Flat S	—50 C	0.0124	Good
4/20	Works Lab.	—50 C	0.0124	Good
4/23	Bal. & Flat S	—50 C	0.0124	Good
4/23	Works Lab.	—50 C	0.0124	Good
4/27	Works Lab.	+ 4 C	2.800	Poor[1]
4/29	Bal. & Flat S	—54 C	0.0082	Good

[1] This poor condition was produced when the new compressor was thrown into use without passing the air through the dryer.

the power house. The need for dependability is the same; only the size of the drier varies. The high value placed on dry air was evidenced when the instrument engineer for a refinery told his management, "Give us an air drier first, and then let's consider new instruments."

Process Air: When compressed air is introduced into sensitive chemical reactions, absolute control of its moisture content or dryness is of tremendous importance. Otherwise those reactions may go astray, just as if other wrong materials had been added to the process. Very much in the technical news now, as described above, is the use of dry air for blowing molten steel, as well as in other metallurgical applications.

Conveying systems using air for handling materials that are affected by moisture employ air dried to low dewpoints. Sugar, additives for animal feeds, and even Portland cement are transported by dry air to prevent gumming and clogging of the piping. Then these materials may be stored under a blanket of dry air to avoid deterioration. It is standard practice at paper mills to unload chlorine by forcing it from tank cars with dry compressed air; this prevents the formation of destructive hydrochloric acid.

Liquid air plants would quickly become inoperative if wet compressed air was admitted to the process. The cycle is self-perpetuating when dry air is used, running steadily for weeks. Eventually they have to shut down, however, because sufficient ice has formed to clog the pipe lines.

In research laboratories and pilot plants where processes are developed and perfected, moisture must be eliminated as a possible variable. Otherwise results will deviate from day to day as the outdoor weather changes. Portable driers may be carried to the job or all air supplied to the department is passed through a central drier. In some processes, of course, entire working areas are held at a constant low humidity by atmospheric driers.

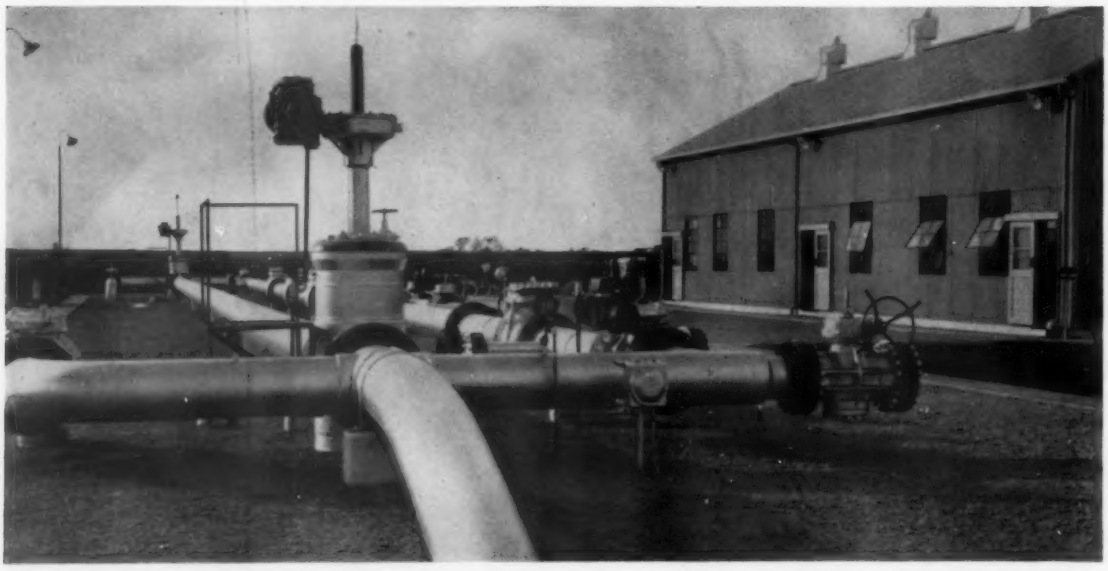
Packaging: Dry, compressed inert gas is piped to packaging machines by manufacturers of foodstuffs and pharmaceuticals. As containers are filled, this gas automatically floods the containers so that, when the lids are dropped into place, there's no air or moisture sealed inside. This helps prevent oxidation, thereby preserving flavor and quality. Sugar packagers follow this same practice so that there'll be no moisture present to cause caking of the contents.

Surface Finishing: The compressed air used for spraying paints and enamel coatings must be clean and dry. Dirt and moisture inclusions in the air become defects in the finish—moisture used for spraying lacquers is responsible for blushing—causing expensive rejections. A drier in the air lines going to spray guns will prevent these losses.

Fire Protection: So-called "dry" sprinkler systems, intended to provide

(Continued on page 230)

Fig. 3. Valves shown here, at a gas pipeline station are controlled and operated by air that has been passed through a drier



99 Per Cent Clean!

Air Filter Cuts Control Room Maintenance

ATMOSPHERIC AIR, notoriously dirty in the area of most sintering operations, is kept pretty near spotlessly clean in a control room at a plant of Columbia-Geneva Steel Division U. S. Steel Corp., Geneva, Utah. Proof of the value of the ultra-filtration dust collector, designed by Wheelabrator Corp., is the fact that past operating history at the plant shows the need for frequent instrument repairs prior to the installation of the collector. Now, it is said, the room is so clean and dust-free that maintenance is practically eliminated.

The collector itself, shown in Fig. 1, uses cloth-tube filters coated with a filter aid. The filter aid, it is pointed out, provides a highly efficient matrix upon which even extremely fine particles of dust and tarry matter are collected. Collection efficiency is described as better than 99 per cent. The collector requires attention only at intervals of one to three years depending upon the operating conditions.

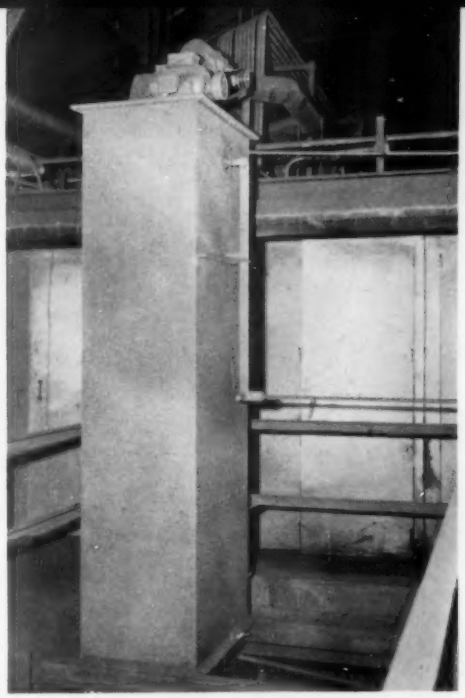


Fig. 1. Dust collector, employing filter aid, provides better than 99 per cent collection efficiency

Fig. 2. Control room at the Columbia-Geneva Steel Division. Even dirty surrounding atmosphere fails to bother controls

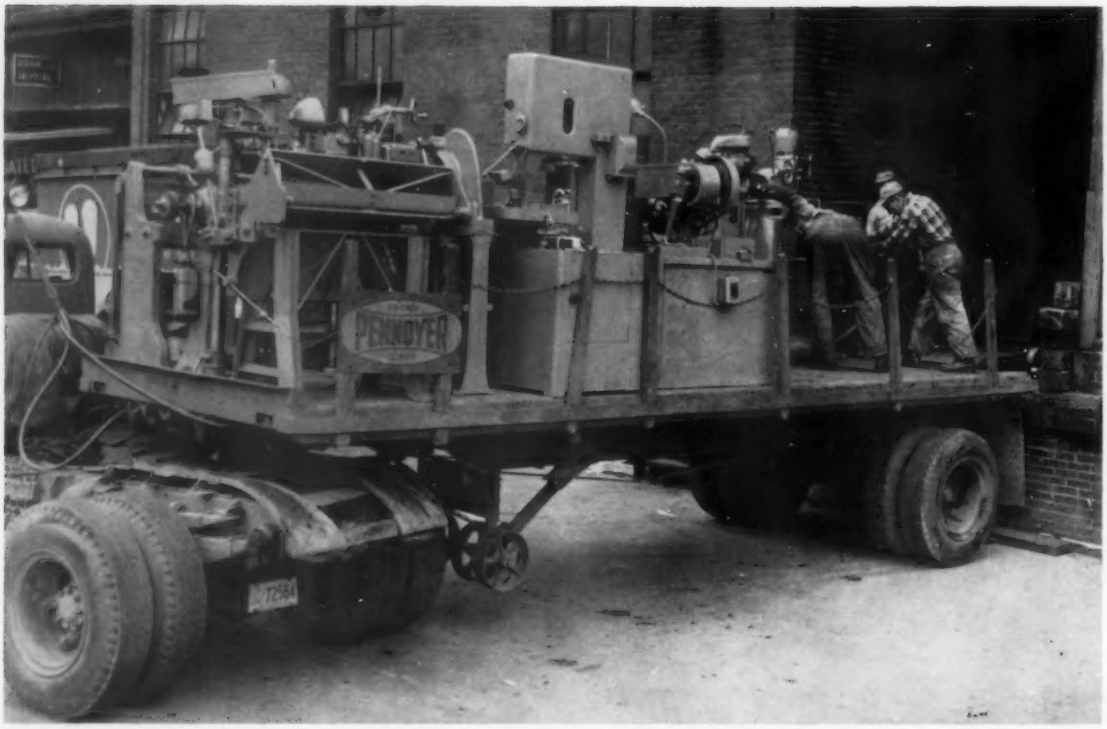


Fig. 1. Some of the heavy machinery is ready for the move from the old plant in Chicago to the new one in Lincolnwood, 10 miles away. A flat-bed trailer is used to allow the movers freedom in placing and securing the machinery

Ditto Makes Each Move Count

Advance Planning Simplified Move to New Plant

MOVING TO A new plant? If you are, you, like Ditto, Inc., have probably spent a lot of hours planning this move.

A good example of how this advance planning helped Ditto on "moving day" can be shown in the two moves from their old facilities in Chicago, Illinois, to their new plant in Lincolnwood, Illinois. An interesting phase of one of the moves was the preparation which took place prior to moving the office equipment from their plant at 2243 West Harrison to the new location.

One of the very first steps before any of the other planning was discussed was that every foreman, supervisor or manager in the respective departments would make a general check of all the office equipment in his department. If the equipment was to be moved to the new plant, a blue tag was placed on it. A red tag was placed on all equipment that was not scheduled for the move. This material was later disposed of or scrapped. The decision was based upon the condition of the equipment.

Planning began with the Moving Committee which consisted of a person from each division plus a staff coordinator. This was a total of 6 persons. Every notice about the move was called to the attention of this committee either by a general session or by communications.

Planning Began in 1953

To show just when this advance planning began, way back in July, 1953, the company issued a bulletin outlining the procedure to be followed by the supervisors in estimating space requirements in the new plant. They were also required to give a complete count of personnel and an inventory of all the equipment in their department on a present and projected basis.

Based on this information, the department heads then collaborated with the office manager, O. W. Manwarren, and the plant engineer, George Kennedy, in making a detailed layout of their department, including both present and projected equipment. Layout of each department was planned on a five year basis. After completing the first detailed plan, each supervisor prepared a flow chart of his department.

A few days after the July, 1953 bulletin was sent to the supervisors, they received a special form for inventorying the equipment. This form covered the number of employees in the department, a list of types and sizes of equipment, present and projected. A number of other sessions and communications followed, up to the actual moving day.

Plans in preparing the equipment for the actual move were coordinated with the movers. The machinery move was handled by Pennoyer Merchant Transfer. The office equipment move was handled by the Reebie Storage and Moving Co.

The afternoon prior to the actual office move, all equipment in the departments scheduled to be moved was tagged by the individuals. Each item to be moved was clearly identified as to department, consecutive number or employee's name, and destination location. Color coding, grid coordinates or room numbers were also employed

to stress where each item would be placed at the destination. For large open areas at the new location, they found that floor markings simplified the job of placing the new equipment.

A general instruction manual was presented to the various moving committee members by the Reebie Storage and Moving Co., to cover the proper procedure for packaging and identifying the equipment. It also included a check list of the various items, along with suggestions for simplifying the job for the movers.

Manual Tells How

The manual covers basic things to consider when planning the move; such as, Determine Space Needs, Including Expansion; Prepare Floor Plan for Work Flow; Anticipate Security Requirements; Plan Cafeteria Size and Storage; Insure Fire Protection; and Check Adequacy and Accessibility of Personnel Facilities.

This is all in preparation of the actual move. When "M" day or moving day came along the following plans went into effect:

Since the manufacturing equipment at the Parker Avenue plant was moved first, we will discuss the moving plan which was followed in transporting this equipment to the Lincolnwood plant. The same preliminary steps in

Fig. 2. One of the first steps is to prepare a layout of individual departments. Here, men examine a finished area layout which will be consulted during the move

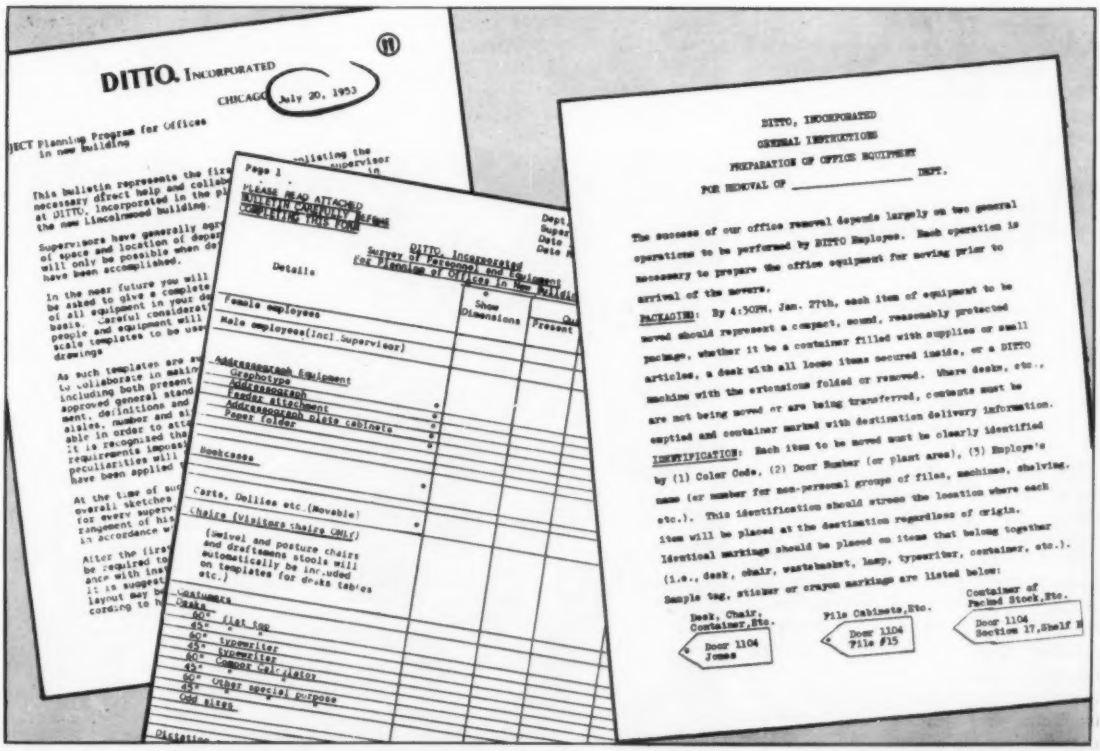

DITTO, INCORPORATED
CHICAGO July 20, 1953
DITTO, INCORPORATED
GENERAL INSTRUCTIONS
PREPARATION OF OFFICE EQUIPMENT
FOR REMOVAL OF _____ DEPT.
The success of our office removal depends largely on two general operations to be performed by DITTO Employes. Each operation is necessary to prepare the office equipment for moving prior to arrival of the movers.
PACKAGING: By 4:30PM, Jan. 27th, each item of equipment to be moved should represent a compact, sound, reasonably protected package, whether it be a container filled with supplies or small articles, a desk with all loose items secured inside, or a DITTO machine with the extensions folded or removed. Where desks, etc., are not being moved or are being transferred, contents must be emptied and container marked with destination delivery information.
IDENTIFICATION: Each item to be moved must be clearly identified by (1) Color Code, (2) Door Number (or plant area), (3) Employe's name (or number for non-personal groups of files, machines, shelving, etc.). This identification should stress the location where each item will be placed at the destination regardless of origin. Identical markings should be placed on items that belong together (i.e., desk, chair, wastebasket, lamp, typewriter, container, etc.). Sample tag, stigmer or crayon markings are listed below:
Desk, Chair, Container, Etc.
Door 1104 Jones
File Cabinets, Etc.
Door 1104 File #15
Container of Packed Stock, Etc.
Door 1104 Section 17, Shelf 3
Page 1
PLEASE READ ATTACHED BULLETIN CAREFULLY BEFORE COMPLETING THIS FORM
DITTO, Incorporated
Survey of Personnel and Equipment
For Planning of Offices in New Building
Details
Present
Female employees
Male employees (Incl. Supervisor)
Addressograph Equipment
Graphotype
Addressograph
Feeder attachment
Addressograph plate cabinets
Paper holder
Bookcases
Carts, Dollies etc. (Movable)
Chairs (Visitors chairs ONLY)
(Swivel and posture chairs and draftsmens stools will automatically be included on templates for desks tables etc.)
Customers
Desks
60" "
45" flat top
60" typewriter
45" typewriter
45" Compose Calculator
60" Other special purpose
Odd sizes

Fig. 3. Preplanning plays an important part in seeing that everything is properly inventoried and tagged to eliminate possible delays or confusion when moving equipment to the new plant. As you can see planning began July 20, 1953

Fig. 4. The control box and other movable parts on this grinder are fastened to prevent damage during the move

Fig. 5. After milling machine has been pried loose from floor, movers use winch and tackle to pull it onto dolly

planning the office move were employed for the machinery equipment.

Over-all planning of this move was handled by the Machine Division manager, with assistance from George Kennedy, plant engineer; Lou Budzinski, charge of production control and stores; Joe Sobieraj, chief industrial engineer; and Ray Williams, purchasing agent.

Planning consisted of assigning space based on a five year expansion period, laying out boundaries of each department and checking with the respective departments for approval. After these plans had been cleared with all people concerned, blueprints of department layout plans were made of the final arrangement.

Floor Markings Helped

This final plan was used when marking the floor in the new plant, to indicate where the equipment should be placed by the movers.

All the electrical equipment on the present machinery was surveyed before that move to determine what would have to be converted to 440 volts. Long before the actual move took place, this equipment was scheduled for conversion on a timetable basis. In fact, at the time of the move, all but a few of the machines had been converted. The equipment which had not been converted was sent out for necessary conversion and returned to the new plant when completed. All machines were cleaned and painted at the old plant prior to the move.

The first department to move to the new plant was the stock room. This move, unstacking and restacking 5000 stock bins, was completed in four days. The second step was to set up light assembly and other facilities.

A foreman from the moving company stopped out at the plant the day before the actual move to check the equipment which would be moved the following day. At this time a check was also made of the electrical, plumbing and other facilities which would be required for the machines.

Two Ditto employees from the department being moved were out at the new plant on the day of the move to supervise the placement of machines according to the layout planned beforehand.

The timetable of the actual moves was as follows: All equipment listed under Move A was begun on January 19. Every other day another group was started. The overall move was completed on January 31.

Fig. 6. Several days before the actual move, the location of each piece of machinery is marked on the floor with yellow paint, following the template layout

Production was scheduled and equipment tagged so that various items could be moved out in staggered groups without halting or slowing manufacturing procedures in the old plant.

The equipment in the Machine Shop provides an example of how this was done. The 79 machine tools in the shop were organized into six groups, labeled A, B, C, D, E, and Miscellaneous.

Planning called for all these tools to be moved in ten days. Each group was to require two days to move and install.

Group-Handling of Tools

Group A, consisting of auto screws, punch presses, hand screw, turret lathe, cut off saw, radial drill press, grinders, and gear hobber, was moved on January 19. The other groups then were moved and installed in two-day intervals.

This enabled employees to move from one operation to another, and then to the new plant, where they resumed work.

Because of the smoothness of the planning, the entire machine shop move was completed on January 31, one working day ahead of schedule, and all without any appreciable loss of production time.

Each move was timed to coincide with cessation of production and assembly operations on the various lines. Thus, while one operation stopped at the Parker Avenue plant, the others kept going. Meanwhile, the machinery for the halted operation was moved and set up in the new plant.

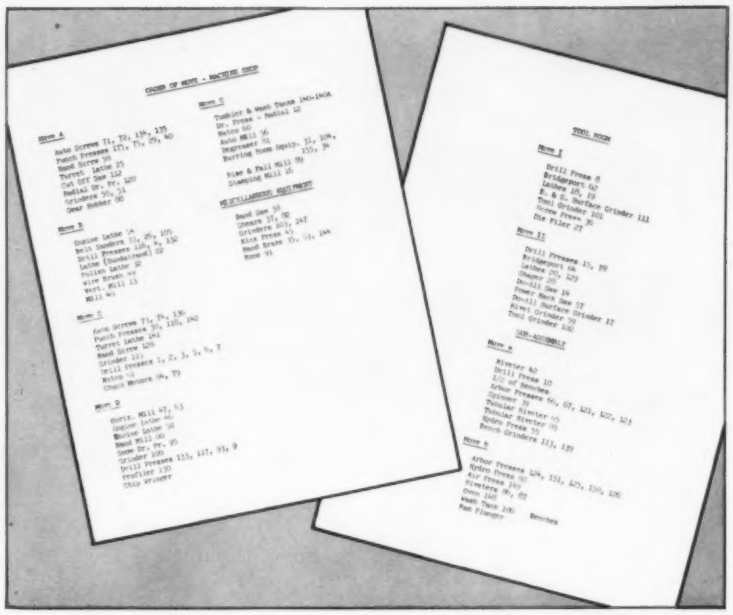


Fig. 7. To simplify the job of moving the many machine tools to the new plant, all the equipment was classified in several moving groups as indicated above

With regard to the office equipment, this is under the supervision of the office manager, O. W. Manwarren. Final instructions sent out to each department covered packaging, identification of equipment and a check list covering a number of items.

Each item to be moved was clearly identified by (1) color code, (2) door number or plant area, and (3) employee's name or by number for nonpersonal groups of files, machines, shelving, etc. This identification stressed where each item was to be placed at the destination regardless of origin. Indentical markings were placed on items that belonged together; i.e., desk, chair, wastebaskets, lamp, typewriter, container, etc. Sample tag, sticker or crayon markings are shown in Fig. 2.

Check list instructions for preparing the following equipment: desks, tables, filing cabinets, typewriters, etc., were presented to each department.

Fig. 8. Movers position milling machine on wooden supports over marking on the floor. When in place, supports are removed and machine is set on shock pads

Method of Marking Sections

An interesting point was the manner in which they were instructed by the moving firm to mark sectional cabinets and shelving. Each vertical section of a piece of equipment should have the same number. However, each shelf or horizontal section having the same number should also be lettered from the bottom up. For example, a three-piece vertical file, given the number 18, would have the bottom file marked 18-A, the next file 18-B, and the top file 18-C. With such markings, the mover knows just how the file should be put back together.

The actual timetable of the moves for the office equipment was as follows: Office furniture and equipment was moved on a Friday evening at five o'clock. Everything was in place at the Lincolnwood plant by 1 A.M. Saturday. Monday morning everything was in readiness for the office force to start work at the new plant.

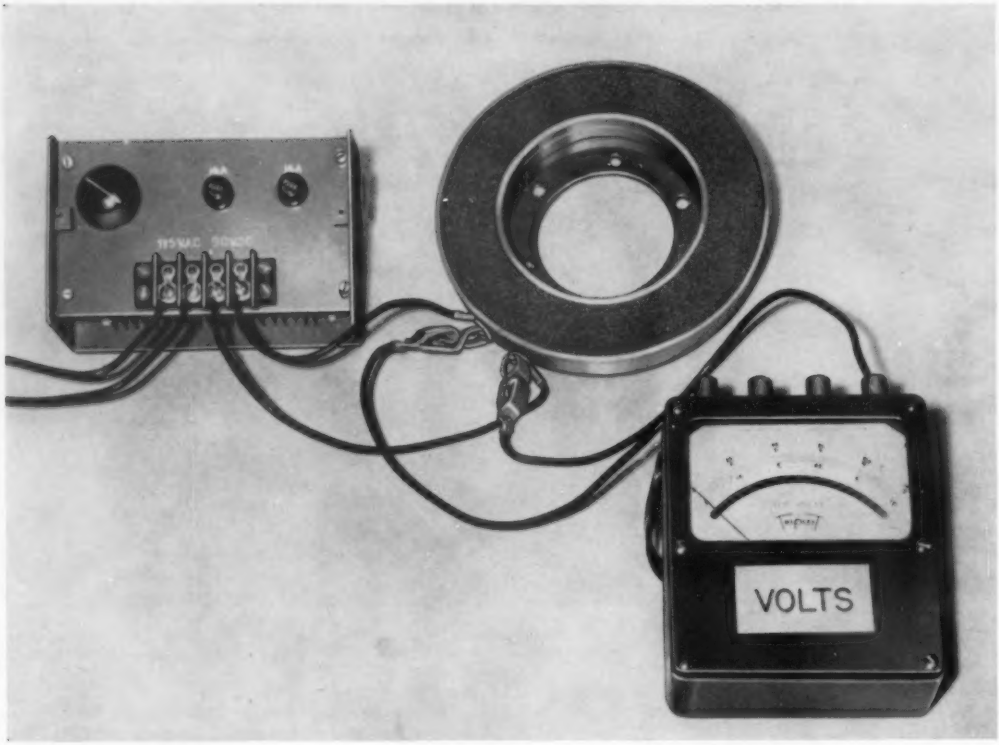


Fig. 1. When a brake loses torque, the first step is to check input voltage to the magnet as described in text

Getting the Most Out of Electric Brakes

Correct Maintenance Means Maximum Service Life

By P. E. MYERS, Chief Industrial Application Engineer, Warner Electric Brake & Clutch Company

ONE OF THE MOST trouble-free components in any machine is the electric brake. When it has been correctly installed, there should be no further need for service or lubrication during the life of the unit. The electric brake is a friction-type device, however, and some consideration should be given to wear rate, because minor adjustments in speed of operation can extend the life of the unit.

Slight changes in torque, made with the control rheostat, can extend the life of an electric brake greatly by decreasing the braking speed. Optimum wear life will be obtained when the input voltage to the magnet is maintained at the minimum required for the desired stop. When the proper speed has been established, precautions should be taken to keep the rheostat at that setting. A good rule to remember is that the quicker the stop, the shorter the service life.

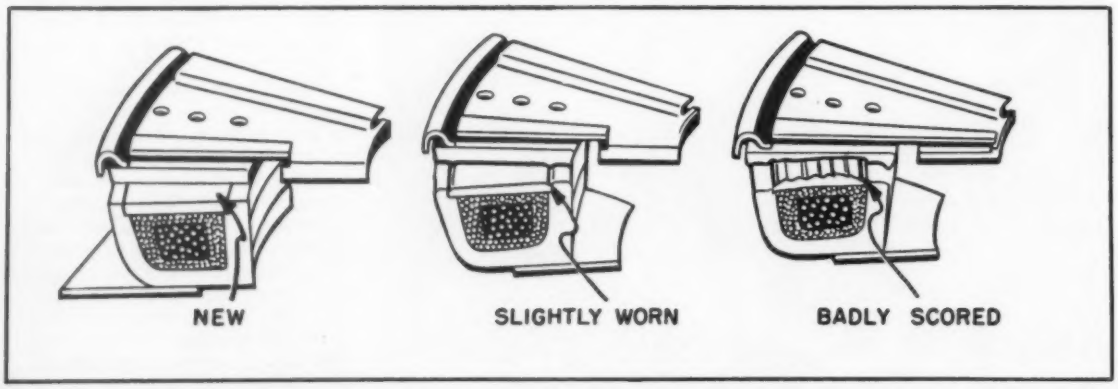


Fig. 2. Typical wear patterns of magnet and armature disc. This is normal wear; does not impair unit's functioning

Table I. Trouble-shooting chart to help isolate troubles with electric brakes

TROUBLE	PROBABLE CAUSE	REMEDY
Loss of torque	Power loss	Check input voltage to magnet. Readings should be in proportion to control rheostat setting.
		Check current. Ammeter should read approx. 0.4 amperes on a 90 volt system—3.5 amperes on a 6 volt system.
	Slipping	Check for break in wiring and repair. Check for oil or grease on armature and magnet friction surfaces. Clean with carbon tetrachloride. Enclose or shield unit.
	Brake is worn out	Replace worn parts.
	Smooth friction surfaces on new brake	Burnish friction surfaces—run-in.
	Poor alignment of armature and magnet	Mount magnet back plate to rigid machine member, such as a casting, motor frame, etc.
Rapid wear	Braking too fast for load and size of unit	Adjust rheostat to slow braking.
	Excessive heat	Ventilate unit if located in tight enclosure. Check speed of operation.
		Check torque and heat specifications for possible larger brake requirements.

Wear grooves will appear on the armature and magnet surfaces after extended service, Fig. 2. This is a normal wear condition and will not impair the functioning of the unit, nor cause it to lose torque. In fact, a new brake may require burnishing, or running-in, before a maximum rated torque can be developed. Never machine the armature or magnet contact surfaces solely to remove grooving or scoring.

Remachining the face of a worn armature is not recommended. But a worn magnet face should always be machined if it is to be used with a replacement armature. In refacing a worn magnet: machine only enough material to clean up the entire face of the magnet; hold the face within 0.005 in. of parallel with the mounting plate; and undercut the molded facing material 0.002 to 0.004 in. below the pole faces.

Automatic wear adjustment, or armature follow-up is provided by allowing the armature to slide freely on the drive pins. As the friction surfaces wear in, the armature advances on the pins so that full contact with the magnet is maintained at all times.

Excessive heat and high operating temperatures contribute to rapid wear. For this reason, units should be ventilated as efficiently as possible, particularly if the operation requires fast, repetitive braking. Overheating of the magnet coil will result if greater than rated voltages are used continuously. Where higher than rated voltages are used to obtain unusually fast actuation, there should be provision in the electrical circuit to reduce input voltage to the magnet after the brake is fully engaged.

If electric brakes are used on machinery where abrasive dust, chips, or grit are present in the atmosphere, enclosure or shielding of the brake may be necessary, if maximum life is to be obtained. Wherever units are enclosed in gear boxes, transmission, or differential housings requiring continuous lubrication, it is necessary to protect the friction surfaces from oil and grease to prevent serious loss of torque. Oil and grease accidentally reaching friction surfaces may be removed by wiping with a rag dampened with carbon tetrachloride. When this operation is performed, care must be taken not to drench the friction material.

If a brake slips or loses torque completely, the first step in locating the trouble should be to check the input voltage to the magnet. This procedure is as follows: for a 90 volt series brake, connect a d-c voltmeter with a range of 0 to 100 volts directly across the magnet terminals. With power on and all external resistance removed from the circuit (rheostat or potentiometer rotated to the maximum clockwise position) a nominal reading of 90 volts for a rheostat control or 60 volts for potentiometer control should be obtained. This voltage reading should decrease as the rheostat or potentiometer is rotated counterclockwise.

The same procedure is followed for a 6 volt series brake, using a d-c voltmeter of approximately 0 to 15 volt range. Normal reading is from 6 to 10 volts, depending on the power supply.

If changing the rheostat or potentiometer setting does not indicate a proportional change in voltage reading, an open brake coil is indicated, and the brake magnet or field must be replaced.

Should no voltage reading be obtained, an open circuit leading to the brake is indicated. Check the electrical circuit for blown fuses, loose connections, grounds, inoperative relays, switches, and associated parts.

If your instruments indicate that the proper voltage is being supplied to the brake coil, check the mechanical parts of the unit to insure the armature is free to move on the drive pins and there is no oil or grease on the friction surface.

Remember that with electric brakes, as with any other mechanical device, installation and operation according to the recommendations of the manufacturer will assure maximum operating life.

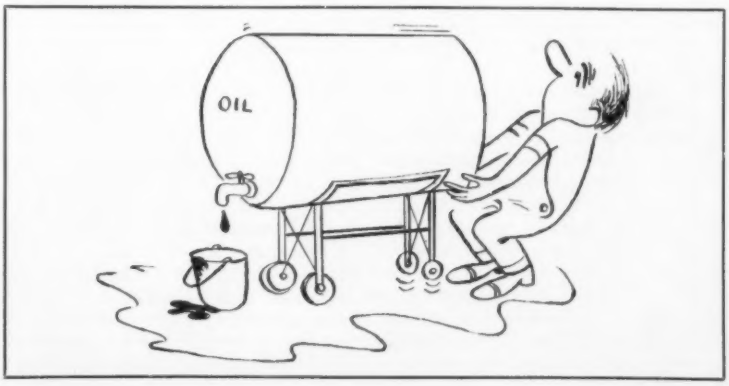


Fig. 1. Here the author supervises the installation of tube bundle at company's distillation and hydrolysis building

Heat Exchanger Tube Sampling

Product Loss and Down Time Both Cut With New "Test Tube" Procedure

By LEIF POLL, Maintenance Engineer, General Electric Co., Waterford, N. Y.

IF THE FAILURE of a tube bundle in a heat exchanger in your plant will result in contamination, gellation, or expensive loss of product, you have a difficult maintenance problem. This is especially true of equipment with small diameter tubes. Losses in product and repair costs at the Silicone Products Department of the General Electric Company at Waterford, New York, can cost more than $2,100 for a failure of this type.

In order to avoid this difficulty, the Waterford plant set up a preventive maintenance program to periodically pull out all important tube bundles for pressure checking, cleaning, and visual inspection. However, this did not stop failures. None of the bundles inspected by this method proved defective, but some failed after only a few months more service. Figure 1 shows the author examining a typical tube bundle being installed in a chemical boiler.

Other methods of inspection were considered, since a pressure test will not necessarily burst a small pitted area. Hammer testing is impossible for closely nested groups of ¾-in. outside diameter tubes. Sonic thickness measurements were unsatisfactory as proven by actual tests. X-raying is impractical or too expensive. Tubes between fixed tube sheets cannot be visually inspected since the bundle cannot be withdrawn from the shell and only limited observation is possible by removing piping, handhole covers, and other parts from the shell. Adequate internal visual examination cannot be made for any of these tubes. It may be possible, after years of service and experience, to predict the life of heat exchanger tubes for a particular service—but any change in the materials of construction or chemical process can nullify this experience.

To solve the problem, a new method of inspection known as "Test Tubing" has recently been started at G. E.'s Waterford plant. By this method, a sample tube or tubes are removed from the bundle. The tube sheet holes are plugged or retubed. In the latter case, a record is kept of the location of the new tubes. However, retubing is seldom necessary since the loss of a few tubes is not usually noticeable in performance.

If the tube bundle size is critical, future designs can include a few extra tubes in anticipation of these removals. When plugging the tube sheet holes, it is better to use toggle type bolted and gasketed plugs than to hammer a plug into the tube sheet hole. A hammered plug may distort the hole. In some cases, welded plugs may be used if the tubes are welded into the sheets.

It is important, when possible, to select the test tube from the tube bundle at a point where the greatest wear or corrosion occurs. Return bend tubes with the smallest radius should be se-

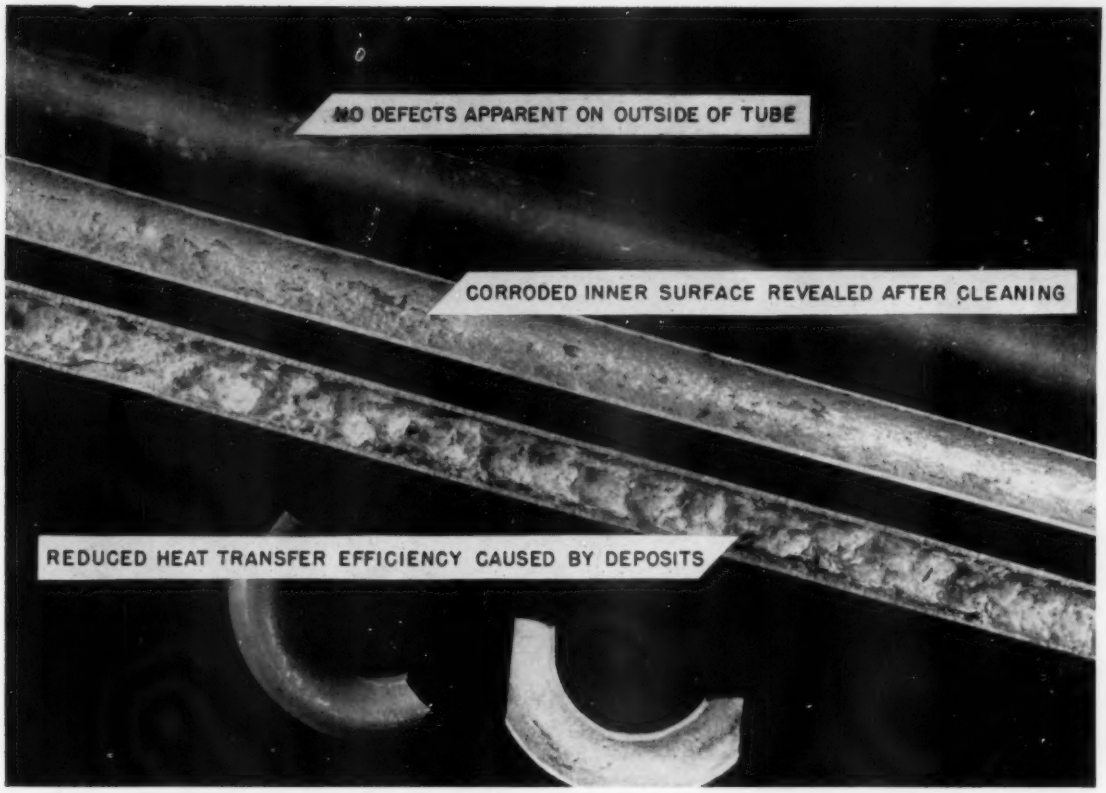

NO DEFECTS APPARENT ON OUTSIDE OF TUBE
CORRODED INNER SURFACE REVEALED AFTER CLEANING
REDUCED HEAT TRANSFER EFFICIENCY CAUSED BY DEPOSITS

Fig. 2. It is important that test tubes be removed from bundle at a point where the greatest wear or corrosion occurs

lected as well as tubes located at a level where they are alternately submerged and floating. After the test tube has been removed, it is tagged and taken to the shop.

At the shop, the tube is sliced lengthwise for its entire length in a bandsaw. The two halves are now exposed for complete internal and external examination. They can be measured for wall thickness at any point. Examination and measurement should be especially directed to the areas of tube bends and near the tube ends where erosion, stress corrosion, and galvanic corrosion are usually most severe. Deterioration of the tube may occur with general wear, localized pitting, or a combination of both.

Measure and note the minimum tube wall thickness, then calculate the thickness required. For example, a ¾-inch Grade A Seamless ASTM A53 steel tube subject to a possible vacuum on the outside, 400-psi pressure on the inside, and a maximum temperature of 300 C can be calculated according to the ASME Boiler and Pressure Vessel Code as follows:

$$t = PR/(S-0.6\,P) + C$$

(A different formula should be used if maximum pressure could occur on the outside of the tube and vacuum on the inside.)

Where P = 415-psi total pressure differential
R = ⅜-in. radius
S = maximum allowable stress value, 12000 psi
C = allowance for corrosion, erosion, manufacturing tolerances, etc.
T = 0.013-in. thickness plus "C."

Before purchasing the tubing, decide what allowance is reasonable for the application for corrosion and erosion. Add to this full thickness an additional amount to account for the tube vendor's manufacturing thickness tolerance, usually 12½ per cent. If the tubes are to be bent 180 degrees it is well to purchase material 1/16 in. minimum thickness for ease in fabrication.

The test tube method of inspection may seem to involve a large element of chance, but if the sample tube selected is at or below the thickness required for the pressure rating, it is time to retube since other tubes in the bundle may be even thinner. If the rate of corrosion indicates that the tube thickness will fall below the minimum permissible before the next inspection, it is time to retube. Tubes allowed to continue in service with less than the minimum thickness are infringing on the ASME Boiler and Pressure Vessel Code safety factor which in the case of the above example is 4. The safety factor is the minimum ultimate tensile strength divided by the maximum working stress allowed by various pressure code authorities for pressure piping and boilers.

Equipment operated in violation of code cannot be insured by the usual agencies. The safety factor is necessary to maintain a safe thickness in view of unpredictable and unknown stress factors such as eccentricity in tube circularity, metallic impurities, and stresses put into the metal during manufacture and fabrication such as drawing, rolling and bending.

Comparison of actual versus initial test tube wall thickness and the length of service will furnish a life expectancy estimate. Test tubes removed during subsequent examinations furnish information to improve this estimate by comparison and statistical analysis.

Figure 2 is a photograph of an apparently "good" tube taken from a tube bundle which failed. Hot oil flowed through the shell, cooling water flowed through the tubes. At the top of Fig. 2 can be seen the slightly cor-

(Continued on page 232)

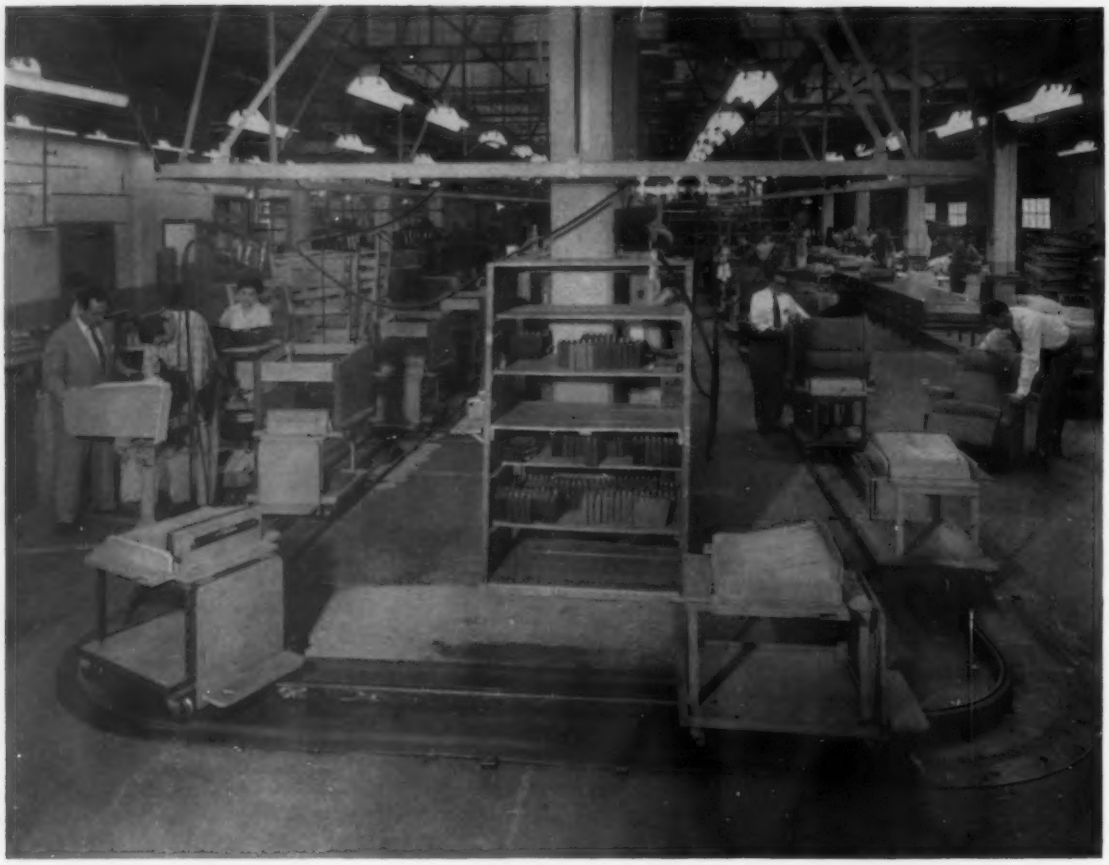


Fig. 1. Chain-driven final assembly line. Chain is set in steel channel on top of floor. Three empty bucks are shown in foreground. All materials for use on product are located near at hand either inside of outside the conveyor oval

Conveyors Speed Furniture Output

Barcalo's New Plant Features Tow Line, Work Stations

A CHAIN-DRIVEN tow line set on the floor of the new Barcalo Elmwood Avenue plant is a piece of equipment seldom seen in a furniture plant. It adds greatly to the plant's efficiency as well as being an outstanding time and labor saver. It is used for the final assembly of the various finished component parts of a new reclining chair.

This new plant is a one-floor, concrete building, covering approximately 36,000 sq ft. It is arranged in departments so that every inch of this space is utilized and materials flow smoothly from the receiving department in one end of the building, through the various manufacturing departments to final assembly, inspection, wrapping and shipping departments in the other end of the building. In each department the materials necessary for the work of that particular section are on shelves or pallets readily accessible for employees.

Raw materials such as rubberized curled hair, kapok, latexed backed sisal, cotton pads and hundreds of different plain and metalized cotton upholstering materials and plastics come into the receiving department. Wood frames, fabricated in the company's Chandler Street plant, and springs and other metal parts, most of which are made at the Louisiana Street plant, are delivered direct to the frame and spring departments at Elmwood Avenue. Frames are on pallets, moved about by a Raymond hydraulic lift.

In line of flow the first operation is the cutting and sewing department. Here standard cutting equipment and seven welt foot equipped power sewing machines prepare various sections for the upholstered covering of the chairs. After inspection these are sent on to the upholstering department.

In this department is an interesting piece of small equipment designed especially by the engineering department at Louisiana Street. This is a machine for cutting the circular coverings for the decorative buttons used on the chairs.

When the machine they wanted did not seem available an air-operated die-cutting machine was assembled. It was equipped with electric switches and safety hand features. This machine will cut through 8-10 thicknesses of cloth or plastic materials at a time. It has been set up near a Handy Button Machine No. 5 which completes the buttons.

Next operation is the frame making. Here doweled sections, sent in from Chandler Street, are glued and pressed

into place by pneumatic presses. These presses were designed and made by Barcalo personnel.

There are separate sub-assembly sections in the department for backs, seats and arm frames of the chair. Backs and seats then go to the spring department.

A typical operation here is the installation of individual spring coils over a base of steel strapping, fastened to the wood frame, these springs then joined at the top by cross helical springs and securely tied. Over all this is a platform on which the filling materials will be placed. When the springs are all in place the backs and seats are sent on to the upholstering department, as well as the side frames and arms. Here again, each type of unit is in a separate section of the department.

The chair back and arm frames are securely clamped to special Barcalo jigs which hold the units at any angle during the upholstery application. Staplers and other tools in the department are air operated.

An interesting part of this department is a steel slat conveyor which runs along one side of it and on which are placed the finished back components of the chairs for final operation and inspection. This is a manually operated belt, 60 ft long, 36 in. wide, moving at the rate of 10 ft a minute, feeding assembles to the outside back operator.

Separate parts of the chair are then ready for assembly. The final assembly chain conveyor installation is set up in the center of the upholstering department. The construction of the floor made it difficult to set the chain channel under the floor as is usually done for this type of installation. A suspended chain drive unit is therefore located in a pit near the starting operation.

Chain conveyor is 162 ft long. It circumscribes a section containing shelves where are stored the various parts and materials used by the workers along the line. There are 19 stations, or bucks, spaced 9 ft apart, towed by the chain drive. The bucks are of special design for holding the chairs at the required angle for assembly operations.

Fig. 3. This is another of the special machines designed and built by Barcalo's plant engineering department. It drastically reduces time taken in assembling the arms of two models of chairs

Fig. 2. This view of one part of the tow-line assembly area presents a good picture of the storage area that supplies parts to the workers on the line

The line moves at the rate of 29⅝ in. per minute. It is controlled by a magnetic push button switch for continuous operation.

Flow about this line begins when a lower arm frame is placed on a buck and side arm covers attached. Front arm posts, arm supports, and arms are then added and the covering finished at back of frame. The frame is then inverted and bottom covering is completed. The reclining mechanism is assembled to the back assembly and arm frame and then attached to the lower arm frame and seat and footrests. The bellows, which reaches from the seat to the arm frame front rail, is attached and name plates are put on. Wood legs, previously fitted with dowels and glides, are put in place, law tags are tacked on, and a finished chair is then ready for removal from the line. In all, it takes three minutes to thus assemble a complete chair.

After being removed from the line the chair is cleaned, given a 100 per cent inspection, wrapped in a heavy blanket paper securely tied in place, placed in a heavy-duty corrugated carton, and sent to the shipping department. Here a Clark fork lift stacks labeled cartons preparatory to shipping and loading into delivery trucks.

There are indeed several features in this new plant that are of interest to plant engineers—innovations such as the plant layout which allows a relatively small floor space to be adequate for the setting up of many departments through warehousing, manufacturing processes to final assembly, inspection and shipping.

Sell Yourself to Sell Maintenance

Here Are More Rules to Help Plant Engineers Do a Good Job

By MAURICE D. O'HERN, Works Engineer, American Steel Foundries, Hammond, Indiana

THE FIRST PART of this article* reviewed some suggestions that should aid in boosting the Plant Engineer to his rightful spot in management. Now, let's see how we can sell ourselves as individual Plant Engineers. As individual plant engineers we have four sets of relationships that must be established to acquire management status. These relationships are with our manager, our fellow department heads, our departmental organization and our craftsmen.

Relations With Your Manager

Your relations with your manager is the easiest of the four for which we can set up successful rules. Just act with your manager as you want your supervisors to act with you. Let's follow this principle—it bears repeating—act with your manager as you want your supervisors to act with you.

1. You want 100 per cent loyalty from your men. They can disagree with you violently to your face but in front of fellow supervisors or in front of their men they must convey in no uncertain terms that unpopular or popular decisions are their own making. You must give your manager the same type of loyalty.

2. You expect courtesy and consideration from your men. How popular is the man who walks into your office 10 times a day as if you had nothing more important to do than listen to how important his work is? Courtesy and consideration demand that you take as little of your manager's time as possible. Make it a matter of pride to see how seldom you drop in and see him. "A man's worth is determined by the amount of supervision he needs." Believe me, your manager will appreciate it and he'll develop respect for your ability to run your own department and make your own decision. Then, you're on your way to taking your place with other management men.

3. Another thing to remember is never go to your manager with a problem. If you are the man you really should be, or if the occasion warrants his attention, go to him with one or two solutions to the problem. Like you, he has his mind filled with many distinct problems, and you place him in an awkward position if you habitually go to him for a solution to your unfamiliar problem. How much more do you think of the man who comes to you with a possible solution to a coal elevator problem than the man who just complains that he can't keep the elevator going? Your manager is the same way. Go to him with a proposed solution.

As a corollary, be extra careful not to put your manager on a spot in front of others. Have you ever seen an engineer criticize management in general when the manager was present in a group? This puts the manager in an untenable spot. He has only two choices. Either to tell you in front of a group that you are wrong, or tell you that you are right. He cannot make either statement in front of the group. Like you, he must be 100 per cent loyal—not 99 per cent, but 100 per cent.

Another spot engineers put their managers on is one that requires an immediate answer to a problem they've been wrestling with for hours or even days. Above all, be careful to avoid such situations with a group of people present.

Admit Mistakes—Because . . .

4. Admit mistakes. This is good for three reasons:

a. First of all, the boss will find out anyway and it would be much better if he got the real story first. If it comes to him from some other sources, it is very likely to be distorted and an incorrect story can leave damaging impressions that correct explanations will not efface.

b. The second reason is for the same reason that you want to know of your men's mistakes—so you can prevent ramifications, prevent recurrences and keep aware of your costs.

c. Third is just plain courtesy—so your manager will know what is going on.

5. Your method of communication should be considerate of your manager's problems and time. How often would you like to throw your clamoring phone out the window? How often has an uninterrupted stream of visitors poured in and out of your office for four or five hours at a time? What you would give if some of these people would only realize you are pretty busy yourself. Make it a point not to plague your manager unnecessarily.

What is the best way to keep him informed? Long hand memos—a half dozen hand-written memos a day—will keep him informed. A power failure in the machine shop—plans are being made to make the air compressors completely automatic—the request for a special appropriation for a new drill pointer requires competitive bids

* The first article "Let's Take a Look at Ourselves," appeared in the June, 1956 issue of PLANT ENGINEERING, beginning on page 130.

which will be in in a week—there is a grievance shaping up in the millwright gang involving assignment of work to carpenters—the second shift supervisor in the tool and die shop is ill with the flu and a temporary foreman has been appointed in his place. In other words, keep your manager informed but not through incessant phone calls or constant visits.

6. One thing you appreciate is quiet and whole-hearted help from your men in those fields in which you are weak. Similarly your manager will appreciate help in your field if he is not an expert in it. Help him out, but don't take advantage of your detailed knowledge. Remember that he has a broader knowledge of more fields than you have and that his responsibilities are many times your own.

Keep Abreast of Changes

7. You expect your supervisors to keep themselves abreast of modern technological changes—you similarly are expected to keep your knowledge up to date. Your manager will naturally expect this of you. If you don't keep yourself informed of new developments, and if other department heads follow the same principle—up-to-date competition will wipe all of you out—manager and all.

8. Official reports. Your official method of communication with your manager is the written report. The need for accuracy in these reports cannot be overemphasized. Reports on project studies, progress reports, completion reports and cost reports must be 100 per cent accurate. One mistake on a report colors the whole report. You must have a reputation for unquestioned accuracy if you wish to be a management man.

Organize Your Reports

Besides accuracy, there is the severe failure of engineers to present reports that can be readily understood. Engineers are too prone to put all the facts into a report, however they do not properly organize, analyze, and present their data to provide a picture that can be readily grasped by someone who has not done all the detail work. Sad to say, these scoop-shovel reports cause those who read them to think that the man who wrote the report had an unorganized mind. Sometimes the shotgun report actually does reflect the engineer.

9. Be a self-starter on projects. Don't be guided by the weaknesses of others. Do a little trail blazing yourself.

10. Blow your own horn. Needless to say, this is to be done in an objective manner. Write memos on such items as an improvement in your power factor or success in the use of carbides on your open side shaper. On major accomplishments, such as a $23,000 reduction in your annual coal bill or a $1000 reduction in the monthly water bill by the use of a cooling tower, write official reports. Remember your successes are a reflection on his managerial abilities. Keep your manager informed of successes!

To sell yourself to your manager,

1. Be loyal.
2. Be considerate of his time.
3. Never go to him with a problem unless you have a proposed solution.
4. Admit mistakes.
5. Keep him informed.
6. Give him solid help in those fields in which he is weak.
7. Keep abreast of technological improvements.
8. Make your official reports masterpieces.
9. Be a self-starter.
10. Blow your own horn.

"WRITE MEMOS"

To sell yourself to your manager you must have a deserved reputation for working with the heads of other departments. First and foremost is the cooperation that must exist with the production departments. This does not mean abject subservience toward production but it does mean careful working with production problems and schedules.

Here is where your scheduled, or preventive, maintenance comes into sharp focus. Your scheduled maintenance informs the production departments that starting on June 6 there will be five down days for overhaul of the high temperature draw furnace. When the production department is told six months ahead of time—and know the reasons—they'll gladly cooperate. On your part you must expect everyone else to accept your plans as rigid. It can and is done.

Cooperation with other departments affects us to a lesser degree but cooperation with the accounting, personnel, product engineering and sales, is important. They can help you—take advantage of their help. Sometimes the maintenance and engineering help from other departments is surprisingly good.

Never, never, indulge in criticism of your management, your fellow departmental heads, or even your supervisors or men in a gossipy manner. This type of tongue-wagging is definitely one of the marks of an immature individual, obviously not yet ready for true management status. It is a common failing of small people to try to get on the same level as other people by tearing them down—not by building themselves up.

Relations With Departments

In your relations with other department heads, the rules you must follow to show you have a true management status are

1. Acquire a deserved reputation for cooperation.
2. Don't be above taking plant engineering advice from other department heads. They're pretty smart, too.
3. Keep out of company politics and gossip.

The most effective manner in which you can establish yourself as a management man—a true professional—is by your relationships with the men in your departmental organization. Your organization is the true measure of you as an executive. Are your supervisors cooperative, well-informed, loyal, cost conscious? If so, take a bow. Or, are they complaining, gossipy, disloyal, sluggish, disorganized? Again, take a bow. They reflect you.

Departmental Organization

1. To build up your organization, you must use one device that is too seldom used. Get rid of your weak sisters. Those people who cannot carry their share of the load must be replaced. Similarly, replace those people who cannot get over their prima donna complex. If you don't replace such people, you are adding to your own load now and forever. Remember, too, that such people are not performing a day's work for a day's pay. Build a strong and loyal organization. With that behind you, any and all plant problems can be solidly faced. Without such backing, your own career is in jeopardy.

2. Assuming that you now have the type of supervisor you want, your next step—and make it an invariable rule—is to act through them at all times. Make it clearly understood that they have full charge of their own section of your department and, here again, remind them that their departmental performance will be the measurement of their performance.

3. It's up to you to provide oppor-

tunities for your supervisor to receive training regularly. This must be a conscious and planned effort. Industrial shows, hydraulic seminars, instrumental maintenance programs, carbide schools are only a few of the many courses available. If you want your organization to start slipping, let your training program fall by the wayside. Provide training opportunities for your supervisors—and yourself.

4. A most effective device for keeping your departmental morale high, is the publishing of important individual accomplishments. An eight hour lathe job is reduced to 45 minutes by carbides, the use of a new cooling tower cuts water cost by $600 a month, a newly designed steam hammer key has eliminated key burning, alloy liners reduced shot peener down time by 80 per cent, scheduled oil filtering on hydraulic units has worked miracles in elimination of service calls — make these accomplishments known to your management and be sure to give credit to the supervisor.

5. To further the effectiveness of your organization go all out in providing mechanized aids: boom trucks, portable filters, lubrication carts, etc. Be constantly on the alert to see that your supervisors have the best tools.

6. To maintain and improve your relationship with your supervisors, you must have daily contact with each one, either on a formal or informal basis. Nothing drives the wedge of misunderstanding so hard as the lack of communication between men. See to it that you visit the work area of everyone of your supervisors every day. A 15-minute meeting every morning with your two or three top supervisors is strongly recommended.

To summarize, prove yourself worthy of management status by developing a strong organization:

1. Weed out weak supervisors.
2. Act through your organization.
3. Use available training programs.
4. Publicize your supervisors' accomplishments.
5. Mechanize your maintenance force.
6. Have daily contact with each of your supervisors.

The fourth set of relationships that we must effectively establish to prove ourselves worthy of being included in management is a set of rules that governs our relations with our men. Being in the maintenance departments we are in a fortunate position since most of our men are of a higher intelligence and are trained craftsmen with pride in their work.

1. By and large, our men are sincere and honest. Since we feel that we, too, are sincere and honest, there is actually a great deal of common ground between ourselves and our men. Another point often overlooked is the fact that most men want to do a good day's work. I think we pay too much attention to the trouble makers and do not do enough in developing the men who do a good job, day in and day out. Using the two principles that most men are sincere and honest and that they want to do a fair day's work, a good supervisor can work wonders.

2. Too much of our so-called union troubles are of our own making. How can you expect men to do eight hours' work if you don't lay out eight hours' work for them. Plan your men's work and let them know the plan.

3. Keep the union committeeman and stewards advised of factors that may affect them or their men. Even let them know your departmental operating costs and costs of material. Let them know the business outlook. Take advantage of the fact that they are as honest and sincere as you and, I might add, as intelligent. If they know reasons for your decisions, they will support you—even to the extent of cooling off some hotheads.

4. Settle grievances on as low a level of supervision as possible. On marginal grievances don't be averse, from time to time, to letting the union have the grievance decided in their favor. There comes a time in your development as a management man when you realize that everything is not completely black or white. There are many shades of gray. Even when these questions are decided in your favor, be careful of the wording of the disposition so there is no trace of vindictiveness.

5. Keep your eyes open for good men. Train them. Promote from within. See that your supply of trained craftsmen is adequate. Apprenticeships and training programs are all part of your responsibility.

6. Just as you like a firm manager who lets you know just what is expected of you, so do your men like you to be firm with them. They like a man who expects eight hours of work. If you don't make an issue of kaffeeklatsches, early quits, loafing, it is going to be assumed that you approve of such practices. You can let it be known without ranting that such practices are taboo in your department. Of course, this requires some follow-up and occasionally reminding some violators. A verbal warning—then a reprimand—the word gets around.

Relations With Your Men

To summarize your relations with your men, if you expect to rate as a management man,

1. Remember that most men are honest and sincere.
2. Keep in mind that most men want to do a day's work.
3. Plan your men's work.
4. Keep your men and union officials advised.
5. Train your men.
6. Remember that men prefer to work for a man who expects a full day's work.

Let's recapitulate the accomplishments you yourself must make to qualify for a management rating. In your relationships with:

1. . . . your manager, you must be a loyal and competent lieutenant.
2. . . . other department heads, you must deserve a reputation for being cooperative.
3. . . . your subordinates, you must develop a top flight organization—it's the secret of your success.
4. . . . your men, there must be mutual respect based on honesty and sincerity.

We have established plant engineer-

ing as a profession and put it on the same level as other major phases of management. We have further established your personal right to be rated a management man. With these two considerations firmly established, selling maintenance projects of any kind becomes mere routine. Without these two major considerations established you are waging a losing battle, and you are out of step with the times. There are a few simple rules that make it easy — and practically routine — to sell management any maintenance project.

Rules on Selling Maintenance

1. Be sure your project is on the forecast.
2. Keep your manager advised of your progress in the study of any project.
3. Make a scientific and psychological presentation of your report requesting an appropriation. Use MAPI, graphs and pictures.
4. Use all available help from production people and others.
5. Be sure to sell intermediate management.
6. After the project is submitted be a real salesman and follow-up.
7. As soon as the project is approved, start the ball rolling to do the work.
8. Issue progress reports and highlight deviations.
9. Issue completion reports.
10. Prepare final report after project is in operation to compare theoretical performance with actual performance.

Now that it has been made clear that the maintenance engineer is a professional management man and that you yourself deserve such a ranking, it is easy to sell management—including yourself—on the value of an effective maintenance program. Basically, management wants a high degree of machine availability, coupled with a minimum amount of maintenance and a minimum amount of money invested in spare parts.

On Handling a Project

You feel that this objective can best be accomplished by a preventive maintenance system, planned lubrication, a first-class record system, and a business-like method of scheduling your work load. Your problem is to convince yourself and other management people that such an organization is worth the money and effort.

There are two good ways of going about this project. The first and time-honored system is to hire an outside consultant. Some people look down their noses at these "experts" but you can get a lot of help from these people.

In many cases, the establishment of an effective scheduled maintenance program requires so much time and study that the ordinary engineer simply does not have the time. Another advantage in getting the help of a consultant is that frequently they have time and the talent to develop your own ideas—ideas that you may have been kicking around for years. A good consultant can save you errors and money. They can prevent you from making procedural mistakes that already have been made by others. Why not have these consultants help sell your own ideas. Chances are that if both you and the consultant know your field, you'll both have similar courses of proposed action.

Again, it's no reflection of your ability if you call in outside consultants. Other professional men such as doctors and lawyers do such consulting regularly. Why not be a professional yourself, and call in experts when you need them?

Another manner of instituting a methodical program is one that takes considerably more time. Many maintenance engineers use it effectively. It starts out simple enough. Take the most troublesome piece of equipment in the plant—the one with the most down time—or the one that holds up production more than any other unit. Sit down with the production people involved and discuss this machine.

Show them how a scheduled maintenance system will relieve them of their biggest headache. It's really simple when you take a specific example. It is particularly easy on an important, but troublesome, piece of equipment. In desperation the production people are at least willing to try your system. Results are miraculous.

For instance, some years ago one company was having untold difficulties keeping their shot peening machines operating all day. The machines were down an hour or two every day, and sometimes for five or six hours. Since the machine was operated 24 hours a day, five and six days a week, production schedules were seriously hampered because the machine was part of a production line. When the macine went down all the units in the following operations were out of work. Not only was production work interrupted but other maintenance work was seriously hampered by the constant demands to service the shot peener.

The maintenance engineer convinced the production foreman involved that it was worth a try to let the maintenance crew have the machine every Friday afternoon for four hours. Right after lunch on Friday the production man is assigned other work and the maintenance men move right in. It has worked like a charm from the day it was started. Fifteen hours a week of interrupted production have become four hours a week of planned cooperation. It's as simple as that.

Tackle One Machine At a Time

Use this plan on your most troublesome machine. Ask the production foremen to give you a list of their really critical machines. Build up a preventive program for this small number of machines. It is easy to do one machine at a time—especially if you find yourself unable to go whole hog in a scheduled system. To go from your most critical machine — to the critical machines in each department— to all major pieces of equipment are comparatively easy steps. And you have attained managements' goal of the ultimate in machine availability — and you have accomplished this with a minimum of maintenance costs.

These are the basic rules for selling maintenance engineering to management. The rest is up to you. Act like a professional! Be a professional!

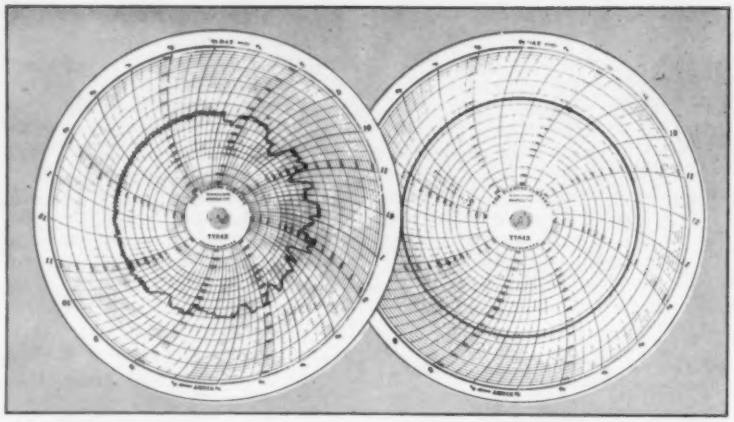


Fig. 1. Chart, l, shows temperature fluctuations at deaerator before pressure regulator installation; chart, r, temperature at boiler feed after installation

Pressure Regulator

Smooths Temperature Fluctuations

By H. H. DECKER, Plant Engineer
Bellman Brook Bleachery Co., Fairview, N. J.

CLOSELY CONTROLLED and uniform temperatures in an Elliot Deaerator are being obtained by Bellman Brook Bleachery, Fairview, N. J., in a most unusual and economical manner—pressure control of the entering steam. The 100,000 lb/hr deaerator is used at the bleachery to drive off water-soluble gases such as air and carbon dioxide by spraying makeup boiler feed water into an atmosphere of high temperature, high pressure steam.

Formerly, we employed an "on" and "off" motor-driven valve actuated by a high grade thermostat on a 30 to 45 psi steam line. However, excessive and objectionable fluctuations in temperature during the operating day permitted gas-laden discharge to enter the low pressure boiler. Sodium sulphite was added to the feed water in large quantities to counteract pitting and other boiler tube damage caused by the entrained gas.

But clearly, the answer lay elsewhere. A chemical additive was a solution—if an expensive one—to reduce the chief problem, but trouble was also encountered when the thermostatically-controlled valve was in closed position, and this difficulty would not yield so easily.

Head pressure on the suction side of the boiler feed pump was reduced to a degree which affected discharge and ultimately caused a loss of economy and efficiency in boiler performance. A great difficulty lay in the venting system's tendency to draw air rather than expel air and hot gas. This was unquestionably due to declines and dips in deaerator pressure, and this "inhaled" air further aggravated the entrainment difficulties.

We replaced the existing equipment with a 3-in. weight-loaded pressure reducing valve, with balanced double seat, made by Atlas Valve Company, Newark, N. J. The slight leakage inherent in double-seat design was considered to be of little account in the continuous service which was required here. The simpler valve cost less than the elaborate original equipment.

The automatic pressure regulator was put into operation in May 1955 with the specification that it rigidly maintain a constant steam pressure so that its co-function, the temperature to which feed water was to be raised, would be fixed within two degrees F of the desired final water temperature. The up-stream side pressure fluctuated between 30 and 45 psi, while incoming water varied in temperature from 100 F to 180 F. By automatically manipulating the volume of entering steam to compensate for the temperature differences in the entering "cold" water, the valve now makes it possible to withdraw 5 psi feed water, free of gaseous entrainment, whose temperature level is kept at or within two degrees of 220 F.

Our current report indicates that uniform steam pressures at the deaerator have meant constant water temperatures, high undeviating suction pressure on the boiler pump, and the complete stoppage of air leaks through the vents.

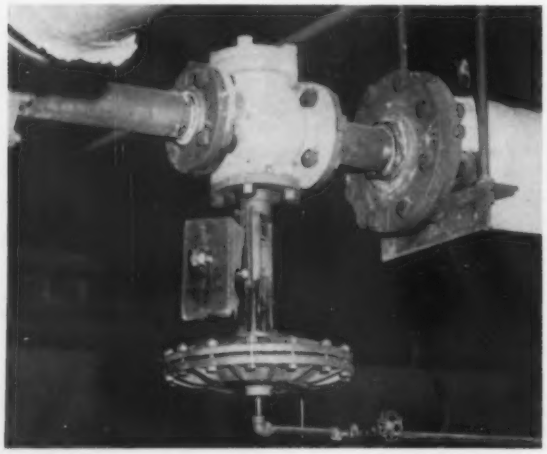


Fig. 2. Closeup of pressure regulating valve installation

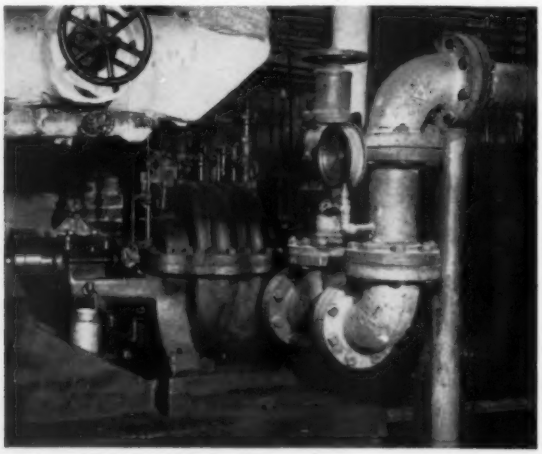
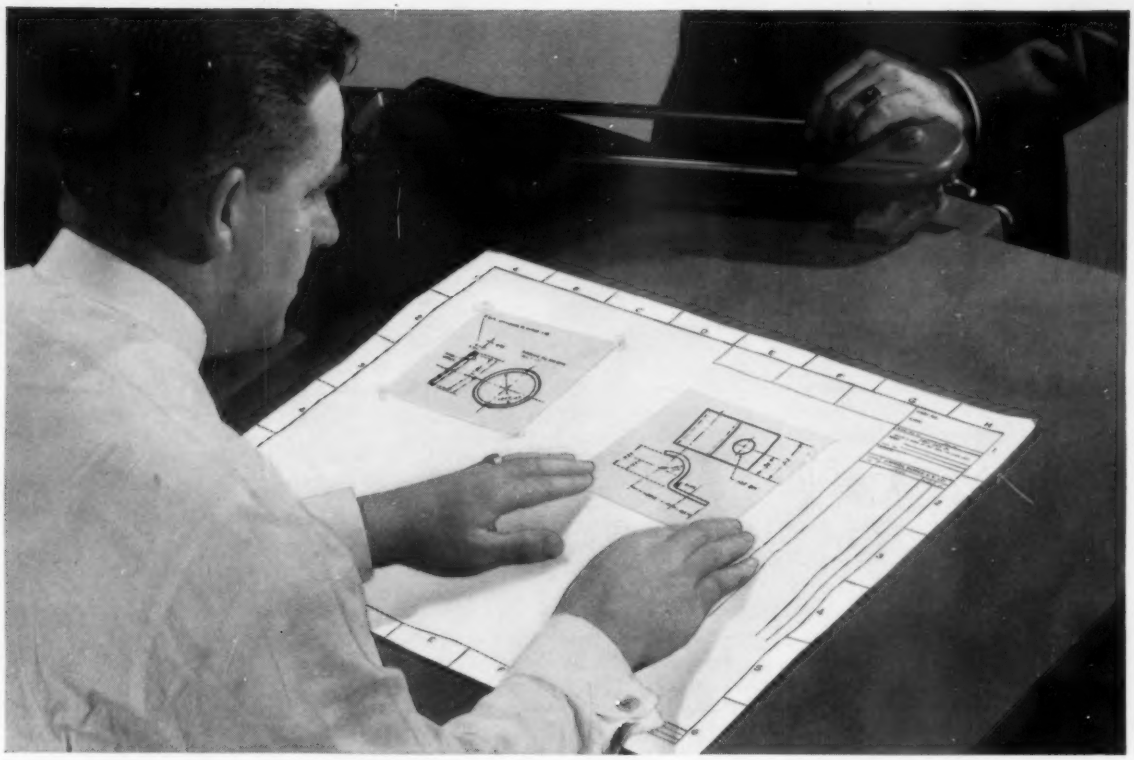


Fig. 3. Feed pump delivers output from deaerator to boiler



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Grinding Wheel Failures—

What the Cause May Be—And What You Can Do About It

WHAT CAUSES a grinding wheel to break? Breakage can be due to a number of things: improper application, careless mounting, remounting to too high a speed or excessive heating. These are just a few of a number of causes of grinding wheel failures.

Here are several suggestions which may prove helpful in extending the life of your grinding wheels.

Speed—Each wheel is marked by the manufacturer to show the highest speed at which it should be used. Most users observe these suggestions. However, most accidents from overspeeding are due to carelessness.

As a wheel wears down, its revolutions remain constant but its surface feet per minute decreases, with a consequent change in the grinding performance. Two ways to extend the use of these wheels is to either increase the revolutions by a cone pulley on the wheel spindle or an electrical control, or use the wheel on another machine whose revolutions per minute is set to give the correct surface speed with a wheel of smaller diameter. However, each of these methods may be the cause of overspeeding because of carelessness.

Causes of Overspeedng

When the speed is stepped up by the use of a cone pulley, there is a serious possibility if the wheel is removed, that the operator will forget to change the belt back to the slow speed position before putting a new large wheel on the machine.

There is also the chance that a careless or untrained operator will use the cone pulley to increase the speed before the wheel is worn down to a point where it would be advisable to increase the revolutions per minute.

When several machines are set up at various speeds with the intention of shifting wheels from one to another as they wear, there is a danger that a new large wheel will be put into service on a machine set to use a smaller worn wheel. This can be avoided by using a device that will limit the size of the wheel that can be mounted on the machine.

Rule 3.3 of the American Standards Association Code recommends that some mechanical means be provided to limit the maximum diameter of a wheel which can be mounted. In instances where this is not practical, machine builders attach a metal warning tag to inform operators of the maximum size of the wheel, plus the type of wheel that should be used for the various available speeds.

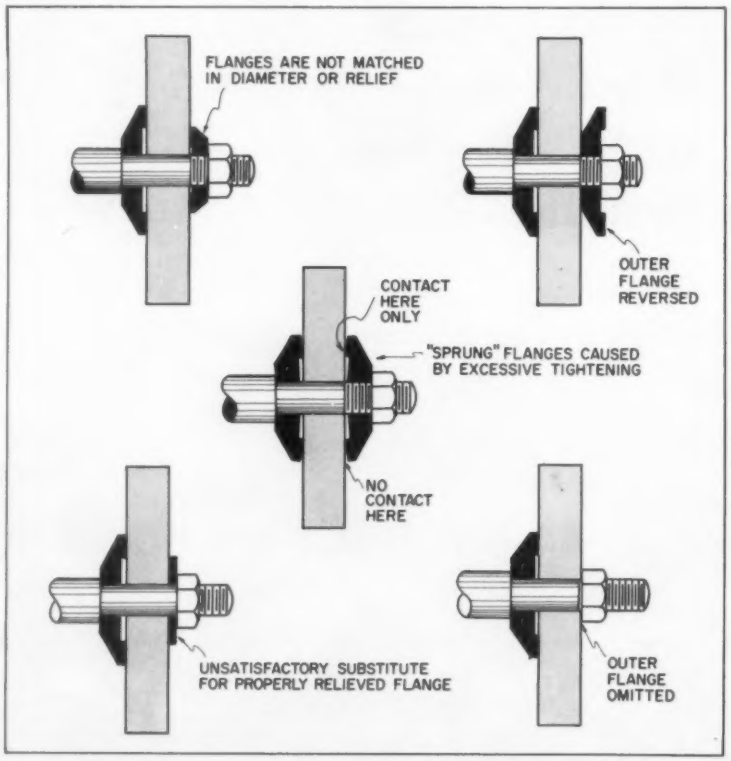
Rule 9.4 specifies that if the speed of a wheel spindle is adjustable, the speed adjustment shall be in control of authorized persons only. Some installations are equipped with locks to enforce this rule. This method is recommended wherever practical, particularly where more than one operator uses a machine and where different sizes or types of wheels might be used.

Heating — Excessive localized heating may set up sufficient internal stress to cause wheel failure. Work never should be forced against a cold wheel, but should be fed gradually to permit the wheel to warm up slowly and evenly. In one continuous operation, extended for long periods during a shift, be careful that the heat generated does not become so great as to cause breakage.

If the grinding is being done wet, check to see that the grinding compound is directed to the point of contact between the wheel and the work. Also, be sure the supply of coolant is not shut off. Failure to maintain a constant and adequate supply of coolant is apt to cause a quick rise in temperature which may break the grinding wheel.

Flanges — If flanges are tightened too much, the wheel may crack. Since a good snug fit is all that is required, do not exert excessive muscular pressure when tightening the bolts. When flanges are held by several bolts, it is a good practice to tighten all the bolts slightly at first. Then, work all around the wheel at least twice, tightening first one bolt, then the one opposite.

Mounting—Many failures are due to faulty mounting or remounting of the wheel. Instances have been disclosed where wheels have been mounted without flanges or with a flange on one side and a nut on the other. Also it is frequently found that


FLANGES ARE NOT MATCHED IN DIAMETER OR RELIEF
OUTER FLANGE REVERSED
CONTACT HERE ONLY
"SPRUNG" FLANGES CAUSED BY EXCESSIVE TIGHTENING
NO CONTACT HERE
UNSATISFACTORY SUBSTITUTE FOR PROPERLY RELIEVED FLANGE
OUTER FLANGE OMITTED

Here are several illustrations of what not to do. If the flanges are tightened too tight or if wheels are mounted improperly, you are asking for trouble

New Revolutionary Steam Trap

One large capacity seat for all pressures!

New Sarco Thermodynamic steam trap. Sizes ⅜ to 1"... each body as small as a tee fitting! Capacity is determined, not by a bulky body, but by the effective orifice, valve action, pressure drop and condensate temperature.

1. Cuts trap inventory

With the revolutionary Sarco TD steam trap, you use exactly the same trap... with exactly the same large capacity seat... for all pressures 10-600 psi... for heavy, light or no condensate load. Sizes ⅜ to 1".

2. All pressures 10 to even 600 psi!

...without changes or adjustments. Self-adjusting. High pressure construction... at a low pressure trap price!

3. Operates perfectly when pressure fluctuates

Absolutely no effect even from 600 to 10 psi! No water seal to evaporate. No adjustments.

4. Widest capacity range

Same large capacity seat for 10 as for 600 psi. Pressures of incoming air and condensate INSTANTLY AND FULLY raises valve head (disc), permitting maximum discharge.

5. Operates equally well on all loads

The same Sarco TD trap for heavy, light or no condensate load. No prime to lose. No adjustments.

6. No oversizing worries

You can size the new Sarco TD steam trap for peak condensate loads... without risk of blowing steam on light loads... no prime to lose... no adjustments.

7. No steam leak required

...to operate the revolutionary Sarco TD steam trap (Pat. Pending). Closes tight against steam!

Convince yourself by 60-day trial... use coupon

SARCO

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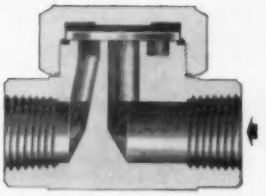
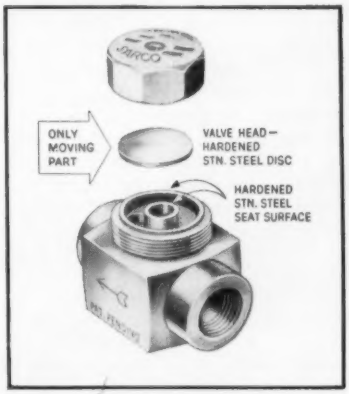


Trouble-free design

Here is a trap so simple, it doesn't even have a valve closing mechanism. The kinetic energy of steam closes the valve. ONLY the new Sarco TD uses this operating principle.

No mechanism parts to wear or stick. No narrow channels to choke. No gaskets to leak.



Maintenance practically eliminated

The all-stainless steel Sarco TD has only 3 parts... cap, disc and body. Only moving part is a hardened SOLID stainless steel disc, practically wear-proof.

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Please send me Sarco TD Steam Trap and strainer for 60-day trial.
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2181-B

wheels are mounted without paper gaskets.

A common fault is to tighten the flanges more than necessary and, unless the flanges are made much heavier than the minimum dimensions needed, serious springing may result.

The following simple experiment will often prove helpful:

Where it is suspected that flanges are being tightened too much, a wheel should be mounted and the flanges brought up just tight enough to hold the wheel. An attempt should then be made to insert a thin feeler gage at various points between the wheel and the flanges. If the wheel and the flanges are perfectly flat, the feeler gage will not enter. The man who usually mounts the wheels should then be asked to tighten the flanges according to his usual custom. When this has been done, the feeler gage test should be repeated. The thickness of the gage that can be inserted will indicate the degree of springing.

When flanges are thus sprung, the effective area of contact is reduced and the pressure is moved nearer the center of the hole where breakage then occurs. It is wrong to think that the use of a paper blotter, though useful, can be depended upon to equalize the pressure. If the flange has a pilot which fits into the hole of the wheel, this tends to spring outward, causing outward pressure inside the hole, and, possibly breakage. The remedy is less pressure, or heavier flanges, or both.

Handling and Storage—Since grinding wheels are breakable and some are very fragile, care should be exercised in handling and storing the wheels to prevent damage that might cause a wheel to fly apart when brought up to speed.

There are many satisfactory ways to store flaring cup wheels. The recommended method is to place them flat on a horizontal shelf, alternating their position so that they will be stacked base to base and face against face.

Most straight and tapered wheels are best supported, on edge, in the racks. Such racks should provide a two-point cradle support to prevent rolling, and they should have a sufficient number of partitions to prevent the wheels from tipping over.

The thin, organic bonded wheels should be laid on a flat horizontal surface, away from excessive heat to prevent warpage. A heavy steel plate, or a thick vitrified grinding wheel, makes a good foundation for stacking.

Cloth-backed thin discs should be stacked as described for the bonded wheels with the exception that they should be stacked cloth against cloth with a sheet of cardboard laid between the discs. Warpage can be prevented by laying a metal plate or large vitrified wheel on the top of the stack.

Cylinder wheels or large straight cup wheels may be stacked on the flat sides with heavy cardboard sections inserted between wheels, or they may be stored in racks.

Transportation — Much breakage of grinding wheels can be traced to the manner in which the wheels were transported from the warehouse to the machine shop crib. Obviously it is dangerous to lay an assortment of wheels on a truck bed and assume they will arrive at their destination unharmed. Nor is it sufficient to pack them loosely in a box for the trip to the next building. All too often other equipment placed on top of the fragile wheels can cause damage.

Special containers should be built out of lumber stock and fastened with screws. The interior should be felt or sponge-rubber lined, and the cover should be hinged and fastened with a stout hasp. Finally, equip them with cleat-type handles. Each wheel should be separately paper-wrapped or all void spaces should be well filled with paper-stuffing to prevent movement of the wheels while in transit.

No Hot Spots or Shadows With Wide-Lite

AREA LIGHTING and floodlighting of buildings to greater degrees of efficiency is being achieved with a unique new floodlight known as Wide-Lite. This light is reported to be the first designed specifically for use with "color-improved" mercury vapor lamps.

Wide-Lite provides a broad, complementary pattern that can be overlapped smoothly to provide area coverage without hot spots or valleys of shadow.

On new installations, these units may be operated on 440/460/480 volts to afford users 300 per cent more connected load than conventional incandescent installations operating on 110 volts. This amounts to a 75 per cent savings on construction requirements for labor and material. The units are operated on 220 or 110 volts.

Another savings made possible by the new floodlight is a drastic reduction in the cost of relamping maintenance. Average life of the fluorescent mercury vapor lamp is from 7000 to 9000 hours as compared with approximately 800 hours for a conventional incandescent lamp. Also, fewer units are needed to light a given area.

Fig. 2. Unique rectangular reflector with wedge-shaped portion behind lamp designed to prevent trapping of light

Want More Information?

If you do, just write "Wide-Lite" on one of the enclosed postage-paid cards in this issue or write The Editor, Plant Engineering, 110 S. Dearborn St., Chicago 3, Ill.

Fig. 1. Only one 400 watt Wide-Lite is used to light the 150-ft front of this plant. Unit is installed on an 18-ft mast that is located 50 ft from building

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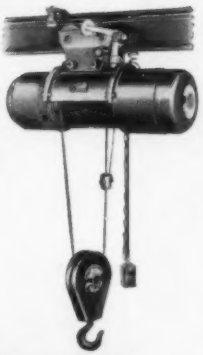

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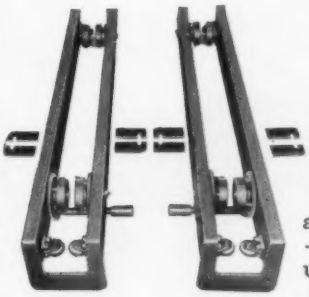

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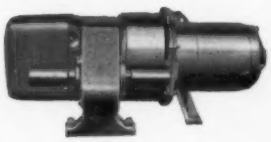

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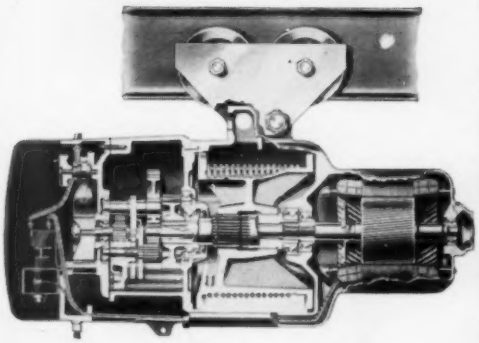

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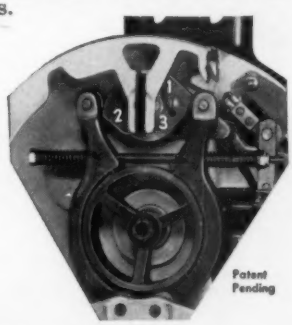

Nothing to adjust but the cam!

Adjustment of this cam-actuated brake to compensate for brake lining wear is simple as ABC. When excessive load hook drift occurs...remove the screw shown at Position **1** (*see picture*), swing the cam until Position **2** is in line and replace the screw. That's all there is to it. For the final third of brake lining wear, set the cam at Position **3**. This is the only adjustment required. Brake springs and solenoid never need adjustment.

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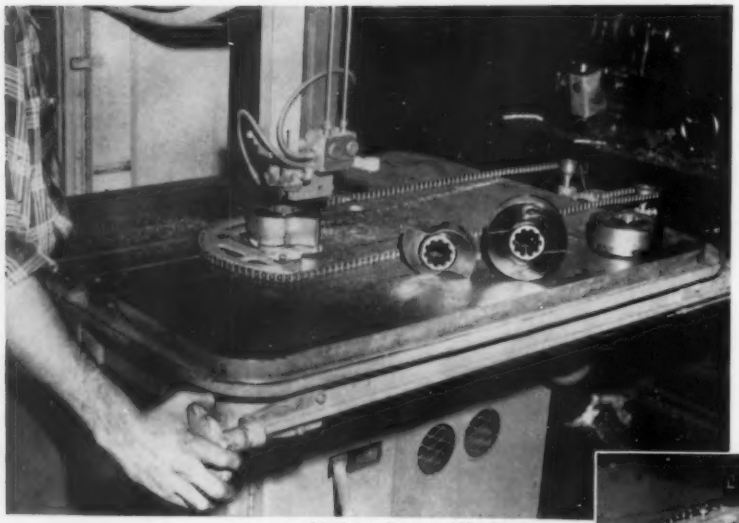
Cams or Crane Hooks—

Band Saw Handles Tricky Jobs, Small and Large



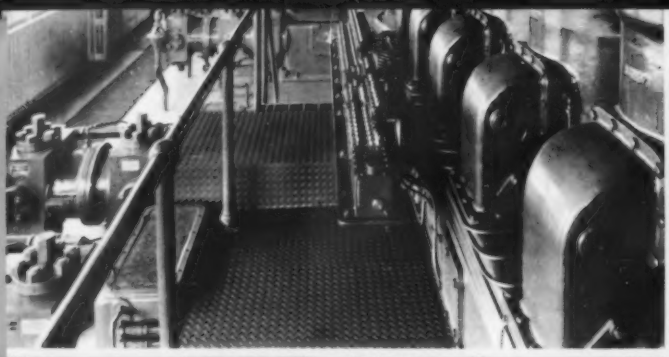
All photos: Courtesy of The DoAll Company.

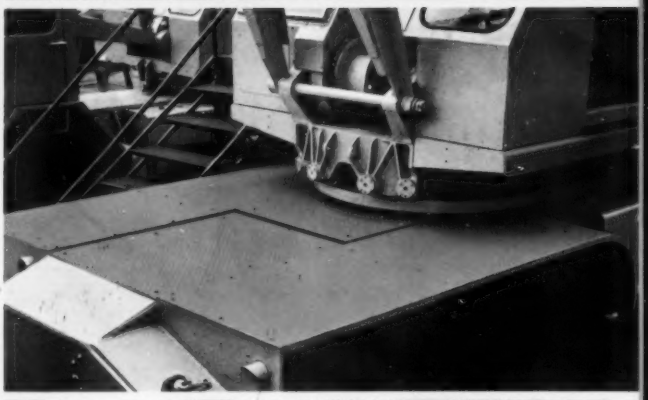
Countour sawing of splined cams is done at the rate of 40 to 60 per eight-hour day at the Lake Shore Machine Co., Cleveland, Ohio, on a band saw. The cams are placed over a fixture (inset), made by operator, consisting of a flat piece of metal welded at right angles to the work holding jaw on the saw. Once the workpiece is positioned, the operator does not have to touch it by hand, since it is turned automatically by a sprocket and chain. A hand wheel control manipulates the piece from left to right, while forward and reverse motion of the hydraulic table is controlled by the operator's left hand

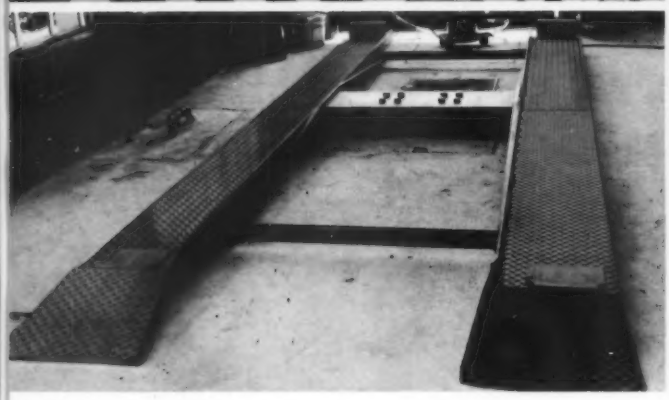
Making 15-in. long slots in 1½-ton, tough steel crane hook forgings, formerly took a total of 36 hr work on a slotting machine at the Moore Dry Dock Company, Oakland, Calif. By using a hand saw fitted with a 186-in. standard saw blade, the job now takes 35 min per cut with a total time required of 4½ hr. Two slots, ⅞-in. wide, and one, 5 in. wide, are made in the hook. Parallels and clamps, which had to be removed after the part was slotted, held the workpiece in the slotting machine. No fixtures are needed to hold the workpiece in the saw. Only four clamps are used

For more facts circle 567 on Reply Card

"THIS FLOORING MATERIAL HAS EVERYTHING." That's what users of Inland 4-WAY SAFETY PLATE say about this rugged, steel flooring material. No other material offers such a combination of advantages. For example, it's (A) STRONG and DURABLE. Not just a safety flooring surface material, but a steel plate that can be used as a structural member. (B) EASY TO KEEP CLEAN. Smooth, non-porous surface with no dirt traps. (C) FIRE RESISTANT. Can be used in applications where ordinary flooring is unsafe. (D) EASY TO FABRICATE. Is readily cut, sheared, punched, welded and formed with conventional equipment. (E) ATTRACTIVE. Pleasing over-all pattern design provides neat, modern appearance. (F) EASY TO APPLY. Lug design makes pieces easy to match. (G) SLIP-RESISTANT. Unique raised-lug pattern gives traction to feet and wheels. For more facts on using Inland 4-WAY SAFETY PLATE, please turn the page.







Manufacturers from coast to coast and in every type of business are discovering how versatile Inland 4-WAY SAFETY PLATE can answer their flooring problems in every case where safety, strength, fire resistance, long life and ease of maintenance are required. They're learning how surfaces covered with 4-WAY SAFETY PLATE pay off in saved man-hours, better fire protection, cleaner plants. They're finding that this same versatile material can add an important (and saleable!) safety feature to many of their products.

The next time you walk through your plant, keep your eyes open for places where rugged, economical Inland 4-WAY SAFETY PLATE can be put to work to help you increase the efficiency of your operation and the saleability of your products. Ask your steel distributor about 4-WAY!*

Send today for your free copy of "18 Useful Ideas", a booklet packed with helpful plant applications for 4-WAY SAFETY PLATE. Address your request to Dick Prendergast, Room 1262.

INLAND STEEL COMPANY

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*Reg. Trade Mark

Remarkable PLASTISOL ...improves so many products it's an industry itself!

So versatile is plastisol (Exon 654 in the Firestone line of vinyl resins) that its uses are spreading rapidly throughout industry.

All kinds of products are being made better to sell better, with the benefits of plastisol compounds made with Exon 654.

Look at the picture above—plastisol at work! *Slush molded* of Exon 654, the doll acquires a natural look and feel, a washable skin. The supermarket wagon is *dipcoated* with Exon 654 so moisture can't rust it. Exon 654 plastisol *coating* makes the handbag fabric more durable, colorful, fashionable. Greases can't affect the Exon 654-coated dish drainer.

Even the car itself! It can actually cost less because plastisol reduced production costs! Assembly lines now use grappling hooks to lift the chassis because abrasion-proof plastisol coatings on the hooks prevent marring or scratching the car surface. And the car's battery and other parts were made in a plant that coated its tanks with Exon 654 so that acids wouldn't corrode them.

This remarkable plastisol, Exon 654, is just one of the many resins in industry's most complete line of versatile vinyls. It is another reason why industry looks to Firestone Exon for engineered answers to its needs.

because it's made of

Firestone

EXON

VERSATILE VINYL RESINS
engineered answers to industry's needs

Firestone Plastics Company supplies the plastisol resin only... does not make compounds or finished products.

For complete information or technical service on the entire line of Exon resins, call or write today:
CHEMICAL SALES DIVISION
FIRESTONE PLASTICS CO., DEPT. 615M, POTTSTOWN, PA. • A DIVISION OF THE FIRESTONE TIRE & RUBBER CO.

For more facts circle 568 on Reply Card

New Pilot Plant Processes Production Prototypes By Chemical Milling

IN A JOINT RESEARCH and development effort with North American Aviation, Inc., a complete pilot line for the chemical milling of steel and titanium has been established at Turco Products, Inc., Los Angeles. In the plant, which duplicates actual production line conditions, four metals—aluminum, steel titanium and magnesium—are now being milled chemically.

Designed for three purposes, the pilot plant will: serve as a research center for development of new techniques in the chemical forming of steel and titanium; it will be used extensively for the preliminary forming of prototype parts for prospective users of the Chem-Mill process; and it has also been designed to train personnel of sublicensees to the process.

The steel and titanium Chem-Mill pilot plant, occupying 800 sq ft, consists of a series of specially-designed processing tanks, equipped with sensitive temperature controls to maintain desired operating conditions. A scrubber system has also been designed to treat effluent gases from the tanks.

The process itself, extremely simple in operation, does not appreciably impair the physical or mechanical properties of the metal, and a minimum of warpage is experienced in processing forgings. The number of parts that can be milled simultaneously is limited only by the number and capacities of the tanks employed.

Laminated Wooden Arches Set New "Span" Record in Building

LATEST RECORD-BREAKERS in the field of laminated wood arch construction are the arches in a commercial building at Riviera Beach, Fla. Twelve arches were used to provide 50,000 sq ft of unobstructed floor space. Spanning a clear distance of 242½ ft, the widest unobstructed space ever covered with construction of this type, the arches are 294 ft long and nearly eight stories high at their center.

The arches were "shop grown" in an Arkansas plant, and shipped to Florida on flat cars. For ease in handling, each was manufactured and shipped in four sections, which were joined and raised into position while still in paper wrappings in which they were shipped from the fabricating plant. The arches vary in depth—26 in. at the base, 46 in. at the point of maximum stress, and 22 in. at the crown.

A four-inch wood deck was applied directly to the arches forming the skeleton of the building. This construction eliminated the need for purlins and other bracing. Only four rows of struts were required, and because of the thermal insulating qualities of the wooden deck, no other insulation was used.

Electronic Batching Controls Mixing of Materials for Ready-Mix Concrete

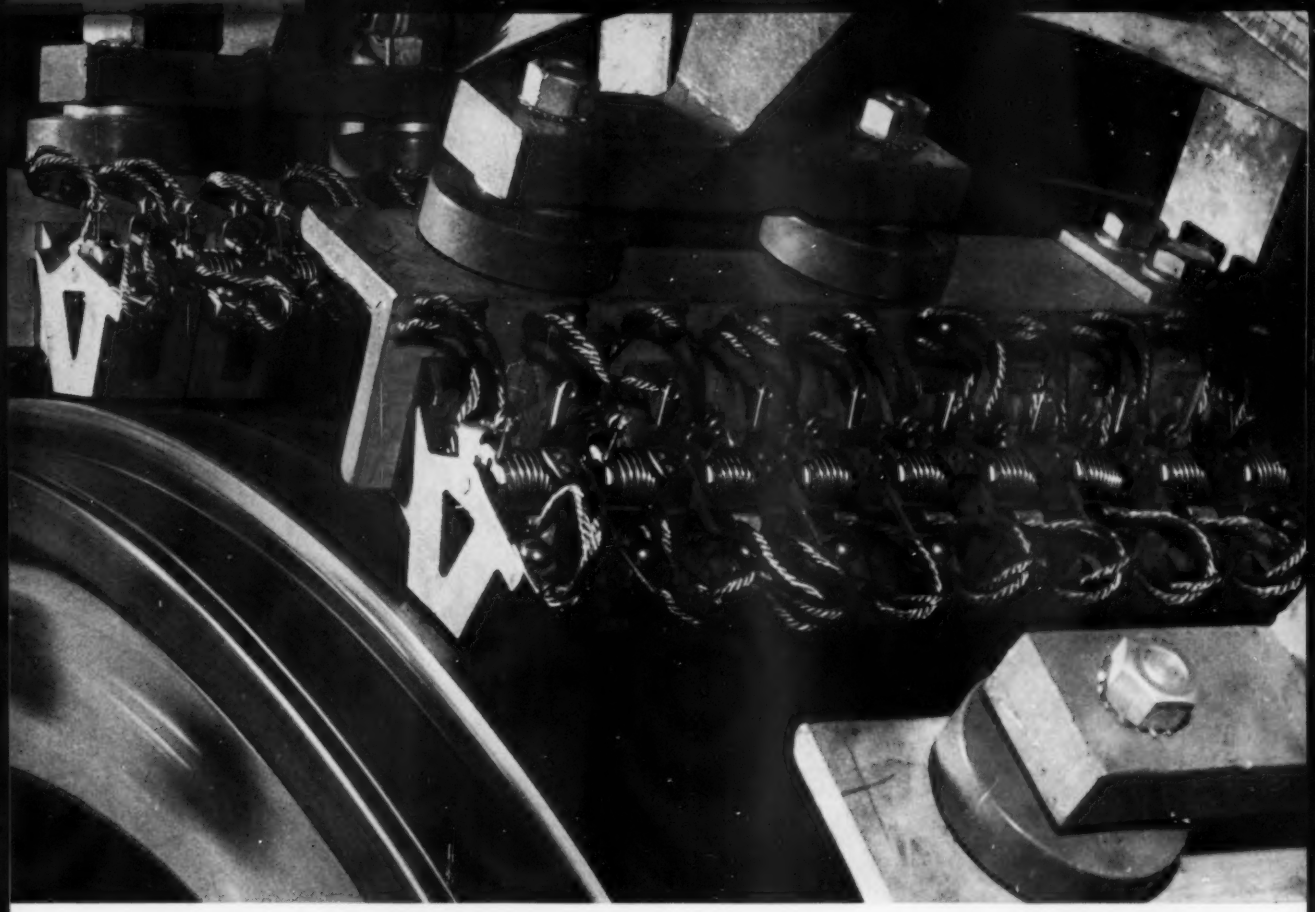
IMPROVED ACCURACY and quality of mix, savings on material and manpower are the results experienced by the Cleveland Builders Supply Co., after installing a punch-card electronic batching system developed by Fairbanks, Morse & Co., in collaboration with Butler Bin Co.

The system employs cards perforated to indicate the weights of materials for each mix and an electronic batching instrument that reads the punches in the card before automatically weighing out the correct proportions of ingredients on hopper scales for discharge to the mixer. Both wet and dry ingredients can be handled, with automatic compensation for moisture being made with a dial setting.

Only one man is required to run the entire batching operation. All controls are centered in the unit directly before the operator, including the punched card electronic reader, the starting switches for the mixer drive, optional manual controls and moisture additive controls.

Batching of cement, aggregate and water starts with the insertion of a card punched to indicate a desired mix. Where a hole is present in the card, contact is made in the reader, producing voltage proportional to the weight desired.

When all the weighing sequences are complete, all three hopper scales discharge in a preset time sequence into a 6 cu yd mixer, for eventual discharge into road trucks.



How engineering development helps General Electric produce the right carbon brush for G-E motors and generators

One way General Electric engineers make sure G-E equipment gets the right carbon brush is to set up actual operating conditions in the laboratory and study brush performance. In one such test, various brushes are run in an air-tight chamber into which contaminants such as hydrogen sulphide, chlorine or nitrogen are pumped. Atmospheric pressure, temperature, humidity, brush pressure, current density and speed can all be controlled to test actual brush performance—and help select the right brush for the job.

THIS IS JUST ONE OF MANY STEPS which General Electric development engineers may take to help make sure your G-E equipment stays on the line. Keeping General Electric carbon brushes on your equipment will help you minimize maintenance and get top performance. And now you can get a carbon brush made by General Electric for any integral-hp G-E motor or generator. For more information contact your nearest General Electric Apparatus Sales Office or Distributor. Write for bulletin GEA-5597. General Electric Co., Section 774-2, Schenectady 5, New York.

Actual operating atmospheres can be simulated in this air-tight chamber to help get the right General Electric carbon brush on General Electric equipment.

Progress Is Our Most Important Product

GENERAL ELECTRIC

For more facts circle 569 on Reply Card

Vertical Casting Wheel Produces Copper in Two New Shapes

THIS VERTICAL casting wheel, in operation at Kennecott Copper Corporation's copper refinery in Garfield, Utah, is producing pure copper in "cake" and billet form. These two new shapes will enable the copper fabricating industry to produce longer sections of continuous rolled or copper strip and foil.

The casting wheel was created to meet increased demands for larger sized cakes and billets. With this equipment, the company can produce copper cakes weighing 2000 lb. Within a few months, the company will be making billets in diameters of three to four inches, weighing 105 lb.

The principle differences of this vertical casting wheel from others lies in the following areas:

1. Molds for billets are attached to the same wheel as are the molds for the cakes. Thus, the dual billet-cake molds on the wheel eliminate the need for changing molds.
2. A total of 28 cake molds and 28 billet molds are carried on the wheel at the same time, making it larger than other units employed by electrolytic refineries.
3. Instead of full immersion in a bath of water to cool the red-hot copper at its pouring temperature of 2150 F, a 25-ft cooling chamber, equipped with fine water spraying nozzles is employed.

Continental's New Research and Engineering Center

CONTINENTAL CAN CO. has opened a $7 million Metal Research and Development Center in Chicago, Illinois. Nearly 600 people—265 are scientists and engineers—will work at the new center.

The three-story building, with more than 260,000 sq ft of floor space is a fireproof structure of reinforced concrete beam and flat slab construction. Windowless construction will permit greater use of space.

The building houses a modern 6,000 volume library, complete pilot areas for can-making and can-closing equipment, and advanced chemical, physical, and microbiological laboratories. Equipment has also been installed for designing, producing, and testing can-making and closing machines.

There is an experimental machine tool shop, 6,500 sq ft of controlled temperature storage rooms for testing shelf life, machine design facilities and equipment assembly areas, in addition to the pilot areas.

Designed to meet the company's research needs for the next 25 years, the Research and Development Center insures maximum interior flexibility. Hollow walls, faced

with semi-glazed tile, can be easily moved to meet future research demands.

The building was designed by Chicago architects Schmidt, Garden and Erickson and erected by the George A. Fuller Co.

New Facility Produces and Tests Fuel Elements for Nuclear Reactors

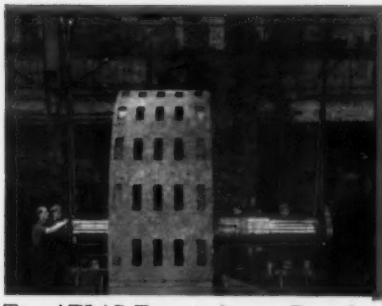
SIX MILES EAST of Lynchburg, Va., the Babcock & Wilcox Company Nuclear Facilities plant has begun production and test of nuclear fuel elements and related products for peacetime use.

The new plant is divided into two spheres of activity—a nuclear fuel element fabrication unit, and an experimental unit where reactor core components will be studied and tested.

The fabrication building, covering 32,000 sq ft, has complete metal casting, rolling, welding and machining equipment to turn out flat-plate type fuel elements. Production is underway on a year's supply of fuel elements for the U.S. Atomic Energy Commission's Materials Testing Reactor at Arco, Idaho.

The critical experiment facility (pictured) stands on a fence-enclosed plot, 1200 yards from the fabrication site. Making up the building are a concrete bay 35 ft high, which will be the scene of actual testing activities, and a low wing. In the high bay, and other areas where fissionable materials will be handled, walls are three feet thick.

Electric power for the plant operations is supplied from Appalachian Power Co.'s 33,000-volt system. Power is bought at 12,000 volts and transformed to 480 volts in four load centers totaling 3,250 kva.



Two ATLAS Type 1, 8-part Round-Braided Slings handling generator unit.

ATLAS Type 1, 8-part Round-Braided Sling used in Figure 8 hitch for handling ship propeller 22 ft. in diameter and weighing 71,500 lbs.

Two ATLAS Type 5 Whip Slings used with an assembly E Sling centering roll in lathe.

Material handling made safe, fast, and easy with BALANCED SLINGS!

ATLAS E-2 with Anchor hooks and Type 5 Whip Slings.

The balanced braided construction of ATLAS Slings results from Macwhyte's exclusive method of braiding endless right and left lay ropes. This method of braiding provides a balanced sling for safe, easy handling of a wide variety of equipment.

Because ATLAS slings are so lightweight and flexible, they are easy to use and save handling time.

Feel free to ask us for recommendations.

We will also make slings to your specifications.

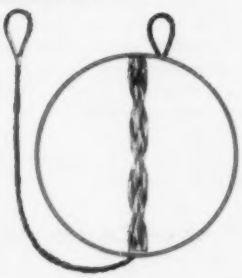
Here's ATLAS balanced braided sling construction

1 One right lay and one left lay wire rope are each spliced endless.

2 These ropes are hand-braided to form a round sling body.

3 All ropes in the body react in the same manner when loaded and each rope carries an equal share of the load.

4 These features produce a lightweight, flexible, kink-resisting sling that hugs the load for safe and economical handling.



For prices, literature, or catalog, call your Macwhyte distributor, or write direct to Macwhyte Company.

MACWHYTE SLINGS

Macwhyte Company, 2991 Fourteenth Avenue, Kenosha, Wis.

Manufacturers of: Internally Lubricated PREformed Wire Rope, Braided Wire Rope Slings, Aircraft Cables and Assemblies, Monel Metal, Stainless Steel Wire Rope, and Wire Rope Assemblies. Special catalogs available.

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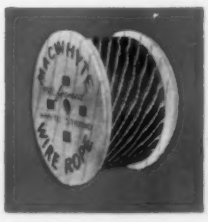

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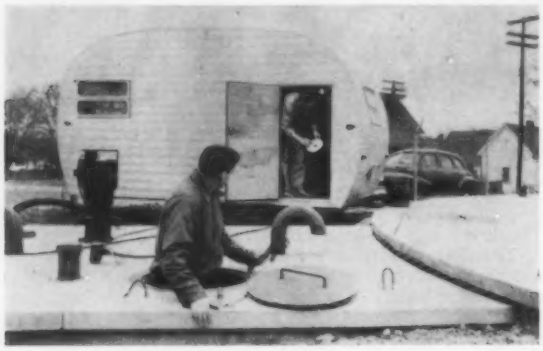
For more facts circle 570 on Reply Card

Trailer-Borne Instruments Save Manpower in Checking Plant Waste Effluents

AUTOMATIC RECORDERS in specially-designed trailers travel from plant to plant in the city of Charlotte, N. C., keeping an eye on industrial wastes being discharged into sewer mains. The city's Water Department has two such trailers equipped to make 24-hr tests of plant effluents by continuous measurement of pH, flow rate, and total volume of flow. This mobile equipment includes one of the first installations of a new compact pH recorder manufactured by the Leeds and Northrup Company of Philadelphia, Pa.



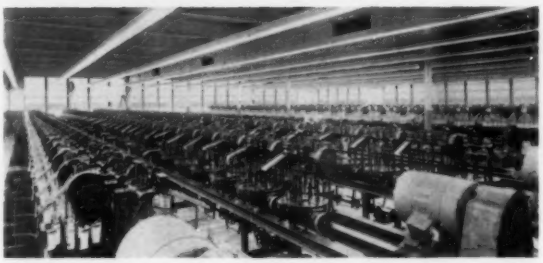
City regulations require that each plant discharging over 40,000 gal a day have its effluent checked every 90 days. In addition, regardless of quantities involved, any corrosive mixtures detected at disposal plants have to be traced to their source and responsible plants notified. This test work has to be done for over 60 manufacturing plants with some 500 miles of sewer lines spread over an area of about 45 square miles.

Use of automatic recorders in the trailers permits the 24-hr test to be conducted without the need for constant supervision. Once the proper instrument connections are made for measurements at the plant effluent line, the pen of the recorder continuously plots the pH value of the waste on its paper chart. At the same time, one of the two Hagan flow meters charts the rate of flow—one meter being used for lower flow rates and the other for higher flow rates. An integrating device on each flow meter shows the total volume of flow for the test period.

Time markings on the charts tie in accurately recorded values with the exact time of day. Charlotte's engineers, therefore, can verify that conditions of plant effluent have remained within permissible limits throughout the 24-hr test period.

Lighting Installation in Textile Plant Wins Certified Lighting Award

AMONG THE WINNERS of the first electrical contractors' contest to be held on Certified Lighting installations, first prize announced was given to the New England Machine and Electric Co., electrical contractors of Pawtucket, R. I.



The installation judged best was installed by the winning contractor, in the Providence Braid Company, Pawtucket, and consisted of 12 rows of single lamp troffers with a total connected load of 11,880 watts. With spacing of seven feet between rows, and a mounting height of nine feet, the lighting system provides 40 foot-candles at working level.

Sponsor of the contest was the Certified Lighting Bureau of Rhode Island.

Nuclear Reactor in Chicago Is Joint Venture of Industry and Education

THE NATION'S first private nuclear reactor for industrial research recently went into operation at Armour Research Foundation of the Illinois Institute of Technology.

The installation will enable industry for the first time to conduct reactor studies without security restrictions and military competition.

The Armour reactor, first since the original nuclear reactor at Stagg Field, Chicago, to be constructed in a highly populated area, is housed in a new $1,250,000 Physics and Electrical Engineering Research Building being constructed.

It was built for ARF by Atomics International, a division of North American Aviation, Inc. The reactor is a neutron and gamma source, not intended for the generation of electrical power, nor for research on reactors themselves. Probably the most frequent use of the ARF research reactor will be in the production of radioactive samples.

As an instrument of research, the reactor makes possible: study of the influence of radiation on chemical reactions, plastics, glasses, organic systems, and certain metallic alloys; chemical analysis through neutron activation; structure analysis potentially more powerful than the standard x-ray diffraction techniques.

Housed in a room about 48 ft long, 72 ft wide, and 30 ft high, the reactor is a "water boiler" type capable of operating at a power level of 50,000 watts.

Twenty-four industrial companies are participating in the nuclear reactor research program at Armour Research Foundation, each firm contributing $20,000 toward the construction and initial operation of the $700,000 reactor facility. ARF is providing the remaining funds.

For more facts circle 571 on Reply Card ——→

CUT COSTS FROM BARREL TO BEARINGS...

Change lubrication methods from

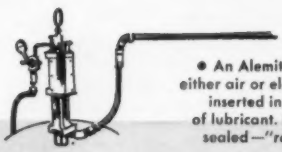
Backward to Forward!

ALEMITE "POWER HOUSE" BARREL PUMP

saves 95 man-hours for every 400-lb. drum of lubricant you use

Lubricating hundreds of bearings by slow, outgrown hand methods is a costly waste of time and money. A modern Alemite "Power House" Barrel Pump does the job much faster—at less cost. You save 95 man-hours for every 400-lb. drum of lubricant used. And because a completely sealed Alemite Barrel Pump system gives cleaner, more efficient lubrication, you make big savings right down the line. Savings in less down-time, and lower maintenance costs . . . in greater efficiency and output.

Air-powered Alemite Barrel Pumps fit directly into either a 400- or 120-lb. drum, send lubricant wherever it is needed anywhere in the plant. Or drum and pump can be placed on a dolly to go right to the machines. You get the big advantage of a completely sealed system. Lubricant reaches bearings "refinery clean"—no mess or waste.



• An Alemite Barrel Pump, either air or electric powered, is inserted in a fresh drum of lubricant. Lubricant is still sealed—"refinery fresh."

• Now the Barrel Pump supplies lubricant, through pipe, anywhere in the plant. Operator simply carries a hose and control valve to outlet, hooks it in, applies lubricant.

• Where piping of lubricant is not practical, power lubrication can be brought right to the machine by simply mounting drum and pump on a dolly.

FREE! New Booklet:
"5 Plans for Better Lubrication"

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Please send me my FREE copy of "5 Plans for Better Lubrication."

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BARREL PUMPS

Products of STEWART-WARNER CORPORATION

STEWART SW WARNER

NEW PLANT CONSTRUCTION —advance information on location, costs

Phoenix, Ariz.—Sperry-Rand Corp., 30 Rockefeller Plaza, New York, N. Y., has announced the purchase of a plant site 15 miles north of here on which it proposes to erect a new plant for the manufacture of electronics parts and equipment for its aviation division. Cost of buildings and equipment reported to be $2 million.

Burbank, Calif. — Lockheed Aircraft Corp., California Division, has plans under way for major company expansion to provide new flight test facilities and new machinery on proposed supersonic wind tunnel. Work is already under way on test flight facilities to cost $7 million including an 80,000-sq ft flight test hangar, an 87,000-sq ft shop, laboratory and office building and a paint hangar large enough to accommodate the larger Constellations. Total cost of expansion, including $4 million earmarked for machinery, will approximate $19 million.

Los Angeles, Calif. — Air Reduction Pacific Co., San Francisco, Calif. (a Division of Air Reduction Co.) has plans under way for construction of new air liquefaction plant in this area. Facility will have a capacity of 55 tons of high purity liquid oxygen, 15 tons of liquid nitrogen and approximately 4 tons of liquid argon. Plant, scheduled for completion in the second half of 1957 at a cost of $7.5 million, will serve increased demands of the aircraft, steel and metal fabricating industries.

San Francisco, Calif.—Bethlehem Pacific Coast Steel Corp., subsidiary of Bethlehem Steel Corp., Bethlehem, Pa., has authorized a major expansion and improvement program to cost in excess of $25 million. Plan calls for the installation of a large commercial drydock representing an investment of $8 million to be completed in late 1957. Drydock installation, 850 ft long by 125 ft wide between walls, will have a lifting capacity of 35,000 tons. $2 million has been set aside for expansion at local yard for replacement of piers and development of a larger and more complete marine machine shop. Improvements are under company supervision and will be built by Shipbuilding Division.

Groton, Conn.—Electric Boat Division of General Dynamics Corporation, Eastern Point Road, has authorized plans and ground has been broken for three-and-one-half story structure to provide additional space for the design division. New building, 35,000 sq ft in area, will cost more than $500,000 and is scheduled for completion late in October. The design department of Electric Boat over the last five year period has quintupled in size and personnel engaged on work on atomic submarines now numbers more than 1,300.

Newark, Del. — Motor Wheel Corp., Saginaw and Thomas Sts., Lansing, Mich., has authorized plans for the construction of new plant for the manufacture of automobile wheels, hubs and drums on 33-acre tract of land near here. The 100,000-sq ft facility is slated to be in production by late spring of 1957. Cost of new project with equipment reported to be $3.5 million.

Palatka, Fla.—Hudson Paper Co., 477 Madison Avenue, New York, N. Y., has announced plans for the construction of newsprint mill adjoining company's kraft paper and multiwall bag plant here. New mill capable of producing 100,000 tons of newsprint annually will employ over 200 workers when in full production, and will be Florida's first newsprint facility, Hudson's first venture into the newsprint field. Plant is expected to go into production the latter part of 1958 and when completed will represent an investment of $25 million.

Lockport, Ill.—Texas Co., Chrysler Towers, New York, N. Y., has authorized plans for the construction of new plant for the production of ammonia, at its Lockport, Ill., refinery. Construction is expected to get under way in the fall for completion late in 1957. Plant will have a capacity of 180 tons of ammonia per day and facilities for converting a substantial part of the ammonia to nitrogen solutions, will be incorporated in the new plant.

Butler, Ind.—Bohn Aluminum & Brass Co., Lafayette Building, Detroit, Mich., has authorized plans for the construction of a new plant for the production of aluminum rods. Plant will be constructed on a 30-acre tract of land recently acquired and construction is scheduled to get under way as soon as plans are completed. New building will have approximately 150,000 sq ft of floor area to accommodate a foundry and rod rolling machinery. Cost of venture with machinery and equipment reported in excess of $2 million.

Lexington, Ky. — International Business Machines Corp., has announced plans for new plant for the manufacture of typewriters on 278-acre tract of land north of here. Company, with headquarters at 590 Madison Ave., New York, N. Y., has also announced plans for the construction of a new 150,000-sq ft laboratory building on presently owned land opposite the Kingston, N. Y., plant. No estimate of cost on either project has been announced but they are reported to represent a multi-million dollar investment.

Baton Rouge, La. — The Wyandotte Chemical Corp., Alkali Square, Wyandotte, Mich., major producer of industrial chemicals, has authorized plans for the construction of an ethylene oxide manufacturing plant on a 700-acre tract of land purchased for the purpose. Company has optioned an additional 500 acres of land on the Mississippi River, 25 miles south of here for future expansion. Plant is scheduled to begin operations in the fourth quarter of 1957, marking first major manufacturing expansion outside the city of Wyandotte in company's history. Plant is reported to be an $8 million investment.

Louisiana, Mo.—The Hercules Powder Co., 917 Market St., Wilmington, Del., has announced plans for the construction of new plant for the manufacture of methyl methacrylate. Plant will be a joint project of Hercules Powder Company and Imperial Chemical Industries, Ltd., of England. New company will be formed to build and operate the plant and each company will own 50 per cent of the new corporation. Work is expected to get under way soon on plant to be located on 20-acre site adjoining Missouri Ammonia Works of Hercules Powder Co. Plant will have a capacity of 35,000,000 lb of methyl methacrylate and will cost an estimated $11 million when completed.

Placitas, N. M.—Dewey Portland Cement Co., 424 Nichols Rd., Kansas City, Mo., has authorized plans for the construction of new cement plant on local site acquired for the purpose, about 17 miles north of Albuquerque, N. M. When the New Mexico plant of the company is in operation with a capacity of 1,250,000 bbl of cement annually, company's total output will be more than 7,000,000 bbl yearly. Plant will represent an expenditure of $10 million when completed.

New York, N. Y.—The American Can Co., 100 Park Ave., has announced a major expansion program to construct facilities for the processing of steel and tin plate from continuous strips. Program calls for construction of a 200,000-sq ft plate processing plant in the Chicago area at a cost of $7 million, including equipment. Other plant installations for plate processing will be built in Oakland, Calif., and Tampa, Fla. Like facilities will also be installed in other areas, such as New York City, Baltimore, Los Angeles and Texas. Most of these installations will be completed by June 1958 and company has approved a budget of $27 million to cover cost of these improvements.

Tarrytown, N. Y.—Union Carbide & Carbon Co., 30 East 42nd St., New York, N. Y., has announced plans for the construction of four large buildings on a 280-acre tract of land purchased

(Continued on page 234)

"Factory Mutual has approved those skylights . . . they're FIRE-SNUF® panels!"

First labeled by Underwriters' Laboratories Inc.,—*now first to receive Factory Mutual approval*—Fire-Snuf, a Resolite product, leads the field in fire retardant, fiberglass-polyester resin daylighting panels.

Actually, Fire-Snuf is self extinguishing and will not support combustion. Each panel or sheet carries both the U.L. and Factory Mutual label.

It is listed by Underwriters' with a flame spread rating of below 75 and is approved by Factory Mutual as "fire retardant."

Specify Fire-Snuf for new and replacement daylighting in industrial buildings. You'll be adding Factory Mutual approval to the long list of proven benefits inherent in translucent fiberglass panels.

Fire-Snuf has all the physical characteristics of world famous standard Resolite . . . light transmission, high strength, durability, shatterproof safety and color stability.

It is manufactured in a wide variety of standard building sheet corrugations and in flat panes, in lengths up to 13 feet and widths up to 42 inches. Fire-Snuf Green is the color which has proved to be scientifically correct for best working conditions and optimum light diffusion.

SEE YOUR NEAREST DISTRIBUTOR FOR COMPLETE INFORMATION, OR WRITE:

See Resolite Catalogs in these Sweet's Files:

PLANT ENGINEERING
INDUSTRIAL CONSTRUCTION
ARCHITECTURAL
LIGHT CONSTRUCTION

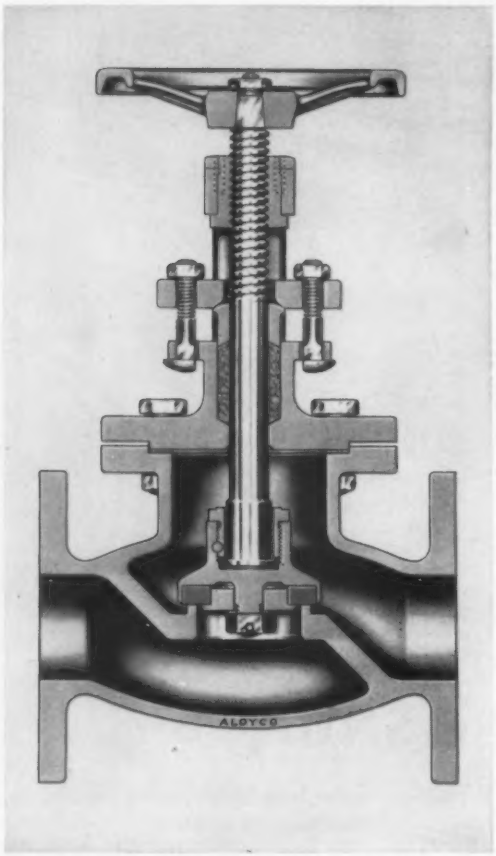
RESOLITE CORPORATION
Box 517, Zelienople, Pa.

Leading manufacturers of fire retardant fiberglass panels.

Distributors in principal cities U.S. and Canada.
Midwest sales offices and warehouse, Chicago 40, Illinois.
Resolite Export Sales, Houston 2, Texas.

For more facts circle 572 on Reply Card

Aloyco valves with renewable Teflon discs out-last metal-to-metal seated valves



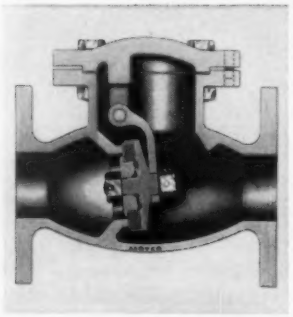
ALOYCO GLOBE VALVE features special holder for renewable Teflon disc to prevent force-out even under heavy overloads.

In handling volatile or elusive fluids, the slightest corrosion of a metal valve seating surface or packing gland is bound to cause leakage.

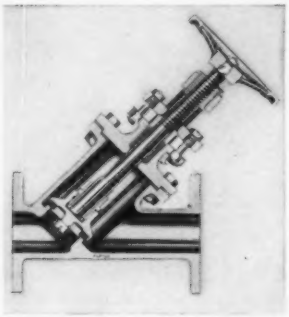
With Teflon discs, however, this leakage is prevented because of Teflon's ability – even when adjoining metal is slightly corroded – to form a gas-tight seal under compression. Add to this the fact that Teflon discs and seats are renewable when worn and you can see why we're using them in so many Aloyco valves.

Teflon, the new DuPont plastic, has outstanding resistance to virtually all corrosive chemicals up to 550° F. It's used as bonnet gasket, packing and seating material in many Aloyco valves specially designed and constructed to take advantage of its remarkable properties.

You can specify Teflon in plain or jacketed, screwed end or flanged Globe, Y, Angle, Swing Check, Needle, Plug Gate or Sampling valves in a variety of alloys and sizes. Send coupon for details.



ALOYCO SWING CHECK VALVE offers greater seat tightness for tighter closing and longer life with renewable Teflon disc.



ALOYCO Y VALVE is easier to maintain and repair, thanks to Teflon disc. Also readies this valve for vacuum service. 5.4

Alloy Steel Products Company, Inc.
1308 West Elizabeth Avenue
Linden, New Jersey

Gentlemen:

I am interested in Aloyco jacketed valves. Please send me a free copy of your Bulletin No. 6.

Name_____

Firm_____

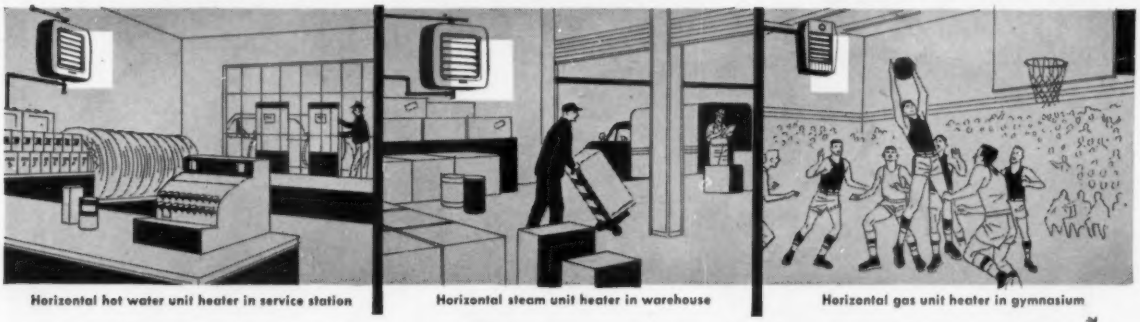
Address_____

City_____ Zone_____ State_____

Longer Lasting
ALOYCO
VALVES
1ST IN CORROSIVE SERVICE

For more facts circle 573 on Reply Card

Vertical steam unit heater in factory | Horizontal gas unit heater in store | Horizontal hot water unit heater in garage



Horizontal hot water unit heater in service station | Horizontal steam unit heater in warehouse | Horizontal gas unit heater in gymnasium

why so many users of unit heaters say

make mine Modine

Satisfied users continue to insist on Modines. They like the high level of comfort Modines squeeze out of every fuel dollar. And they approve of the attractive appearance, the safety, the silent operation . . . the little care Modines require.

FOR STEAM AND HOT WATER

Modine horizontal delivery models are built in blow-through and draw-through types, in 36 different capacities. Direct-from-pipe suspension hook-up many times saves up to $20 on each Modine unit.

Modine vertical delivery models are offered in 26 different capacities, each with a choice of 4 types of air deflectors.

Write for free Bulletin 155.

GAS-FIRED

Modine horizontal delivery gas-fired models are offered in 8 AGA-approved sizes — 25,000 to 310,000 Btu. Choice of stainless or aluminized steel heat exchanger with stainless steel burner. Units are up to 50% lighter than other makes for lower shipping and installation costs. Modine port design provides four times the free area of conventional drilled ports.

Write for free Bulletin 656.

NOTE: Modine offers a specially built line of premium HCR models for use where internal corrosion is a problem.

For further facts, see the Modine representative listed in the classified section of the phone book, or write Modine Manufacturing Co., 1563 DeKoven Ave., Racine, Wisconsin.

Steam and hot water unit heaters

Gas-fired unit heaters

Modine UNIT HEATERS

In Canada: Sarco, Ltd., Toronto

U-1324

For more facts circle 574 on Reply Card

Now- Get Full Protection Engineered into *3-Phase Motors* with a Single Built-in KLIXON Protector

Specify and use motors with Built-in **KLIXON PROTECTORS**

- ★ **Eliminate Motor Burnouts**
- ★ **Reduce Production Down Time**
- ★ **Minimize Motor Repairs and Replacements**
- ★ **Assure Maximum Motor Capacity Under Any Conditions**
- ★ **Simplify Motor Controls**

For years motor manufacturers have looked to Klixon Protectors for the best inherent protection in single-phase motors. Now this same dependability can be built into your 3-phase motors — covering a horsepower range from fractional up through 7½ hp. (600 V.)

KLIXON Protectors Prevent Overheating Caused By:

1. Prolonged overloads
2. Single phasing
3. Stalling
4. Failure to start
5. Lack of ventilation
6. Increase in ambient temperatures
7. Plugging or reversing duty

Specify and use motors with Klixon Inherent Protectors. The additional cost is low . . . the savings high. Write for Bulletin MOPRI for details of inherent motor protection.

KLIXON®

METALS & CONTROLS CORPORATION
SPENCER THERMOSTAT DIVISION
4509 FOREST STREET, ATTLEBORO, MASSACHUSETTS

For more facts circle 575 on Reply Card

HE KEEPS THEM ROLLING—
THE MAN FROM ATLANTIC

The Atlantic specialist in industrial lubrication is a highly skilled expert. He's spent years in the study of every heavy lubricating and cutting-oil problem . . . and he's backed by other Atlantic specialists in lubrication research, production, quality control and marketing.

Atlantic's experience since 1870 has made us familiar with *your* lubricating needs. We've developed the products necessary to do any lubrication job perfectly . . . at the lowest cost . . . for every wheel that turns in industry.

Your company can benefit from our extensive experience and services. For further information on Atlantic's family of products for industrial lubrication and metal processing, write or wire Dept. M9, The Atlantic Refining Company, at the nearest office listed below.

ATLANTIC

LUBRICANTS · WAXES
PROCESS PRODUCTS

PHILADELPHIA, PA.
260 South Broad St.

PROVIDENCE, R. I.
430 Hospital Trust Bldg.

CHARLOTTE, N. C.
1112 South Boulevard

SYRACUSE, N. Y.
Salina and Genesee Sts.

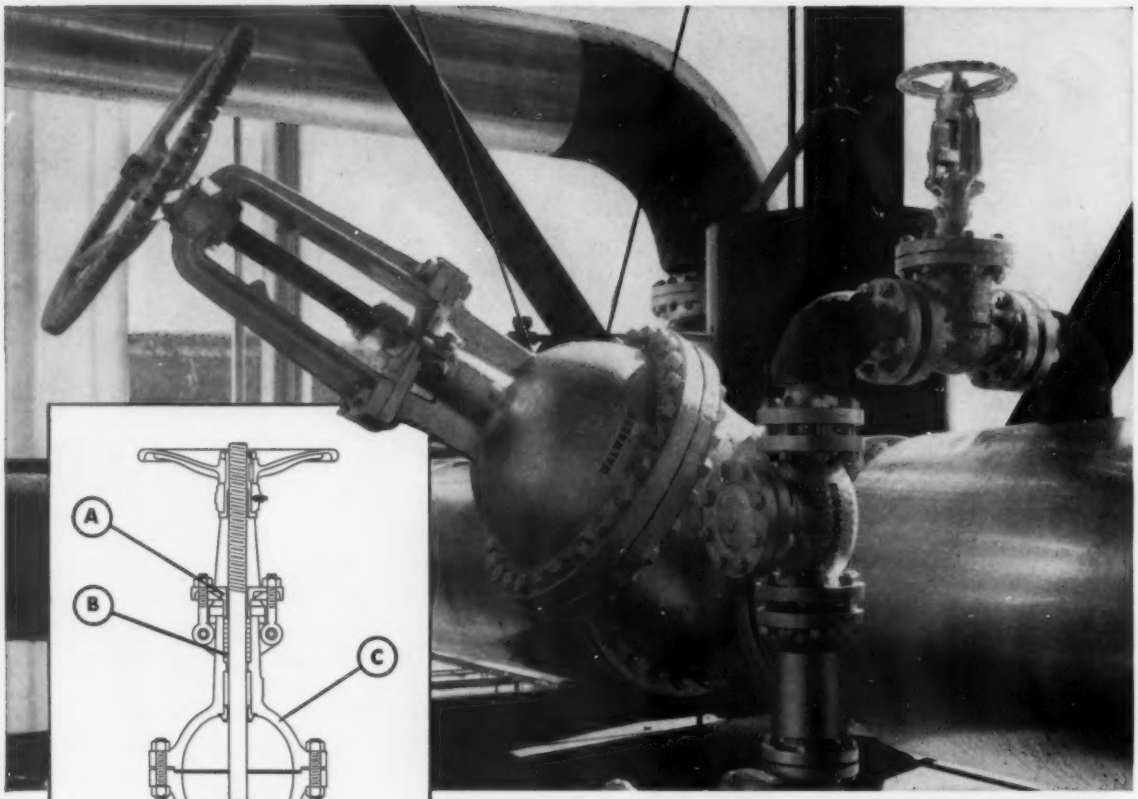
READING, PA.
First and Penn Aves.

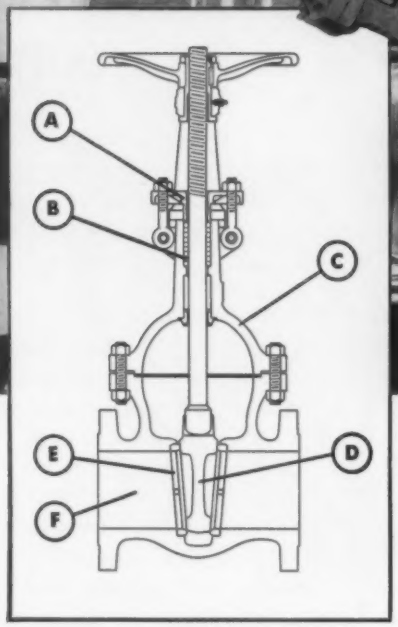
PITTSBURGH, PA.
Chamber of Commerce Bldg.

Atlantic Refining Company of Brazil
Edificio Castello
151 Avenida Nilo Pecanha
Rio de Janeiro, Brazil

Porto Rico Oil Company, Inc.
Box 4832, San Juan, Puerto Rico

For more facts circle 576 on Reply Card





Walworth Series 150 and 300

CAST STEEL GATE VALVES OFFER YOU THESE FEATURES

for 'round-the-plant service

(A) GLANDS: Clearances between the gland and stuffing box, and gland and stem, are such that the stem cannot be scored even if the gland is pulled down unevenly.

(B) DEEP STUFFING BOXES: More than adequate in all sizes (2" to 24") to assure tightness and maximum packing life.

(C) BONNETS AND BODIES: Engineered to exceed the requirements of all applicable codes and standards. They are tough, durable, dependable.

(D) INTEGRAL GUIDE RIB FACES IN BODY: Machined to insure accurate centering of the gate.

(E) STURDY SEAT RINGS: Bottom-seated so that no recess exists at the back of the ring to cause turbulence, erosion and pressure drop.

(F) STREAMLINED PORTS: Permit unobstructed flow which results in minimum pressure drop and reduces the possibility of erosion.

Walworth Cast Steel Gate Valves can be furnished with either flanged ends or butt welding ends. Roller bearing yokes are available on the larger sizes. On valves 4 inches and larger, by-passes can be furnished. Walworth Cast Steel Gate, Globe and Check Valves from Series 150 to 2500, are available. For Series 600 and higher, we recommend Walworth Pressure Seal Cast Steel Valves. See your Walworth Distributor or write to Walworth for complete information.

WALWORTH

60 East 42nd Street, New York 17, New York

SUBSIDIARIES: ALOYCO ALLOY STEEL PRODUCTS CO. CONOFLOW CORPORATION M&H VALVE & FITTINGS CO. SW SOUTHWEST FABRICATING & WELDING CO., INC. WALWORTH COMPANY OF CANADA, LTD.

For more facts circle 577 on Reply Card

Wissco Belts travel stamped aluminum plates for domestic refrigerator evaporators through multi-temperature-zone brazing furnace. This is another example of how . . .

FAMOUS NAMES

ride on WISSCO BELTS

Reynolds Metals Company • Louisville, Ky.

Reynolds Metals Company, recognized as a leader in the aluminum industry, uses 80-20 alloy Wissco Rod Reinforced High Temperature Belts in this production-line operation at its Louisville plant.

The Wissco Belts are repeatedly subjected to elevated temperatures ranging from 1025° F. to 1190° F. and to the corrosive action of a salt flux. Wissco Belts have been used since the Reynolds plant was opened. They are standing up extremely well, and give economical service with minimum maintenance.

Wissco Alloy Processing Belts are the choice of many famous names in industry—leaders in their fields. You, too, will find Wissco the most economical and efficient belt for high temperature jobs—for metals, ceramics, glass annealing and decorating.

For details, *just write or call our nearest office:*

THE COLORADO FUEL AND IRON CORPORATION
Denver and Oakland

WICKWIRE SPENCER STEEL DIVISION
Atlanta • Boston • Buffalo • Chicago • Detroit • New Orleans
New York • Philadelphia

WISSCO BELTS
PRODUCT OF WICKWIRE SPENCER STEEL DIVISION
THE COLORADO FUEL AND IRON CORPORATION

CF&I

2770

For more facts circle 578 on Reply Card

Dracco system recovers $1,000,000 of dust a year

Catching microns is a million-dollar business at the Alloy Division of The Brush Beryllium Co., Elmore, Ohio. There a Dracco Dust Control installation collects 900 pounds per day of beryllium-copper alloy dust valued at $5 per pound—an annual recovered treasure worth over $1,000,000!

Twin Dracco Multi-Bag Filters handle the dust-laden exhaust from electric furnaces which produce the critical alloy, extracting precious particles at 99½—100% efficiency. The million-dollar dividend of dust is returned to process for reuse.

This profitable product recovery system has also given Brush Beryllium a cleaner, healthier plant in which men and machines work better. Potential problems of product contamination and air pollution have been avoided. And improved plant efficiency has cut costs.

If your problem is recovering a dust fortune . . . or eliminating a dust that is a nuisance or a hazard, Dracco experience qualifies it as the top organization to work with. A Dracco engineer will be glad to discuss your problem with you. Call or write today.

DRACCO CORPORATION

4035 East 116th Street • Cleveland 5, Ohio

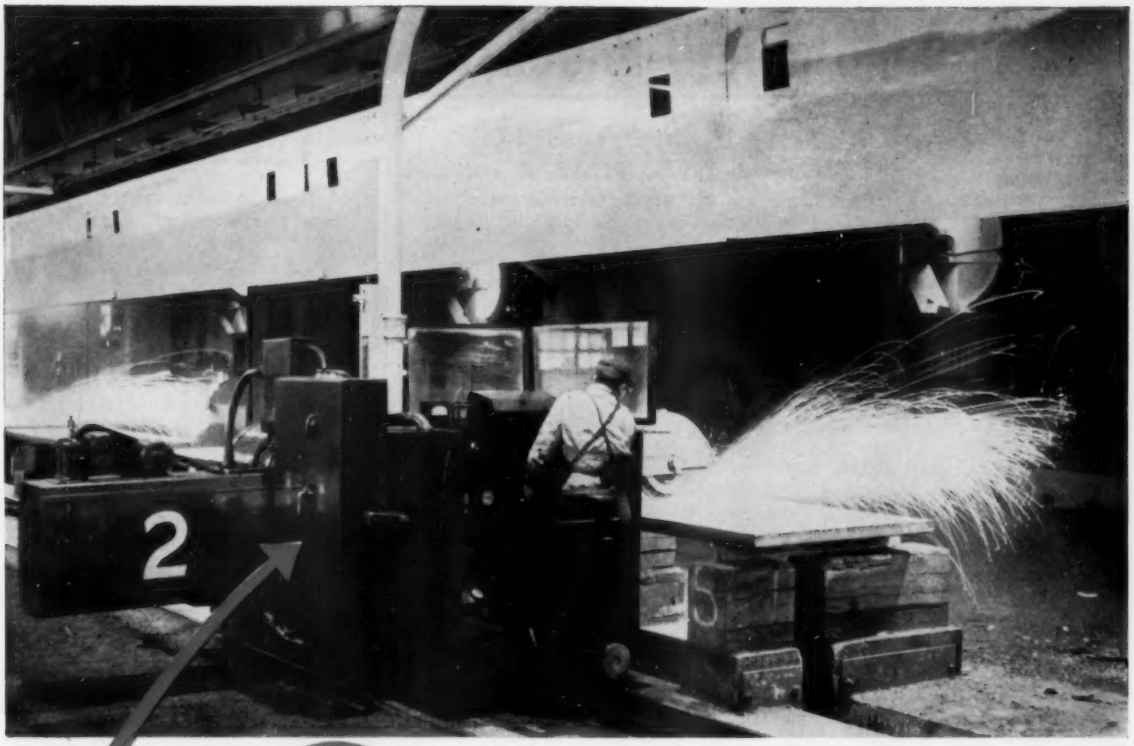
Filtering a fortune—Pay-off from Dracco Dust Control system at alloy plant is recovery of $1,000,000 of product dust annually. Operating 24 hours a day, filters have needed "negligible maintenance" since installation in 1953.

Bulletin 800 is Dracco's 40-page catalog on dust control and recovery. Contains detailed facts and figures on all dust control equipment. For your copy, write Dracco today.

DRACCO *Performance Proved*

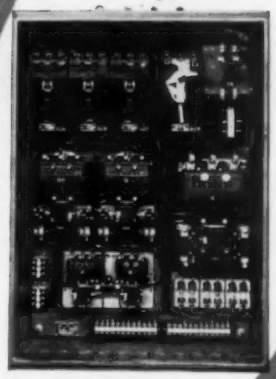
Airstream **CONVEYORS • DUST CONTROL EQUIPMENT**

For more facts circle 579 on Reply Card



CLARK Type "CY" CONTROLS

help Mid-West Slab Grinders triple output at Crucible Steel!



Clark Type "CY" Control Panel mounted on each machine contains a size 0 reversing, two size 2 and one size 3 Type "CY" motor starters.

Ten track mounted billet grinders built by the Allied Machine and Engineering Co., a subsidiary of Mid-West Abrasive Company, are setting new performance standards at Crucible Steel's Midland, Pa. mill. Replacing manually operated and unwieldy swing grinders, these machines do the job better, faster and safer with electrically-controlled hydraulic positioning.

Accurate and complete control of stroke, wheel position, rotation and pressure results in smaller metal loss, less wear on grinding wheels and better finish. Clark Controls provide the accuracy and dependability these machines require, and prove again that Clark Type "CY" starters have the extra stamina required for heavy-duty mill-type service.

The CLARK CONTROLLER *Company*

Engineered Electrical Control

1146 East 152nd Street • • Cleveland 10, Ohio

IN CANADA: CANADIAN CONTROLLERS, LIMITED • MAIN OFFICES AND PLANT, TORONTO

For more facts circle 580 on Reply Card

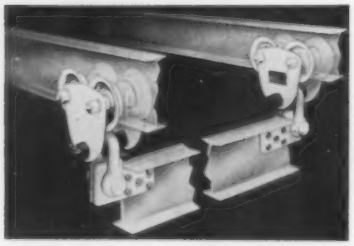
NEW PRODUCTS AND PROCESSES summarized for your convenience

Edited by M. E. Heniken

More information on any of these products can be yours without cost or obligation. Just circle the item numbers on the Reader Service Cards provided on pages 241-242.

1—CRANE KIT to install on bridge I-beam

Selling for less than $100 is a kit from which a push-type underhung bridge crane can be assembled. Called the Budgit Single Carriage Bridge Crane Assembly, Catalog 64, this kit can be installed on a locally purchased bridge I-beam in less than 2 hr, says manufacturer. Five holes drilled in each end of the I-beam permit bolting the two trolleys provided to the ends of the beam. Each kit consists of two I-beam trolleys; two clevises with pins; two pairs of beam end plates and necessary washers, bolts and nuts. The steel trolley wheels have hardened treads, and deep flanges to prevent climbing the runway. Axles have pressure fittings on the outside so that grease can be conveniently forced into the bearings. Load thrust is said to be automatically centered under each trolley due to clevis support design.



The cranes handle spans to 25 ft, come in capacities to 2000 lb. Wheels are adjustable to operate on American Standard I-beams of from 6- to 12-in. size. Used in conjunction with a chain block or electric hoist, the kit provides a complete, economical crane suited for serving localized areas, small shops, loading docks. Shaw-Box Crane & Hoist Div., Manning, Maxwell & Moore, Inc.

2—METERS transmit high pressure, high velocity flows

With these high-head differential pressure meters, high pressure, high velocity flows may be transmitted pneumatically on a linear flow basis, it is announced. Utilizing the accuracy of mercury U-tube measurements, they automatically convert a differential pressure to rate of flow. Features announced are low cost, accuracy, rangeability, simplicity and flexibility.

These transmitters measure the rate of flow of steam, water and other liquids and gases producing maximum differentials from 100 to 1200 in H_2O. The mercury U-tube is available for maximum service pressures of 800, 3500 and 6000 psig. Where mercury is undesirable, a bellows type is available for maximum service pressures of 1500 and 3500 psig. Signals are SAMA standard, 3-15 psig or 3-27 psig. Receivers may indicate, record and/or integrate. Product Specification P22-6 gives data. Bailey Meter Co.

3—TREAD PLATE of non-skid abrasive aluminum

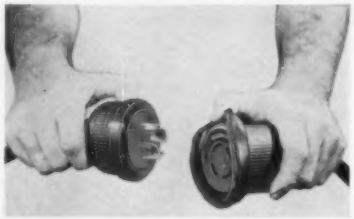
This abrasive tread plate is rolled from ingot by a method which provides a fused aluminum abrasive oxide on one surface of the plate. Layer of abrasive is metallurgically bonded to the aluminum plate, says company—in welding, for instance, the abrasive layer does not separate from the plate. The non-skid surface is of value where oil or ink may collect on floor surfaces, on bridge walkways, in food processing plants and sewage disposal units. Durable and corrosion-resistant, plate can be shop fabricated by most commercial methods, including shearing, sawing, punching and drilling. Aluminum Co. of America.

4—INDUSTRIAL COATING with anti-static feature

According to manufacturer, the formula for Gencote 108 utilizes Teflon as the base material, retaining all of its characteristics, but reverses the electrical insulation feature to create electrical conductance. Thus, it is possible to achieve an anti-stick, dry-lubricated, chemically inert surface, company states, that is anti-static as well. Applied on interior of chemical and drug cone blenders, it serves to prevent light powders from sticking to sides, assuring accuracy in mass-compounding of formulas. On conveying equipment, anti-static feature permits powders to flow freely. Electrical resistance across the coating, when applied in a 4-mil film, is about one ohm. Surfaces can be coated in multiples of ½ to 10 mils, on any type metal or other materials which can withstand a temperature of 700 F., required for baking process. As a result, electrically conductive surfaces can also be applied over an insulating base. General Plastics Corp.

5—CONNECTORS offers increased sealing protection

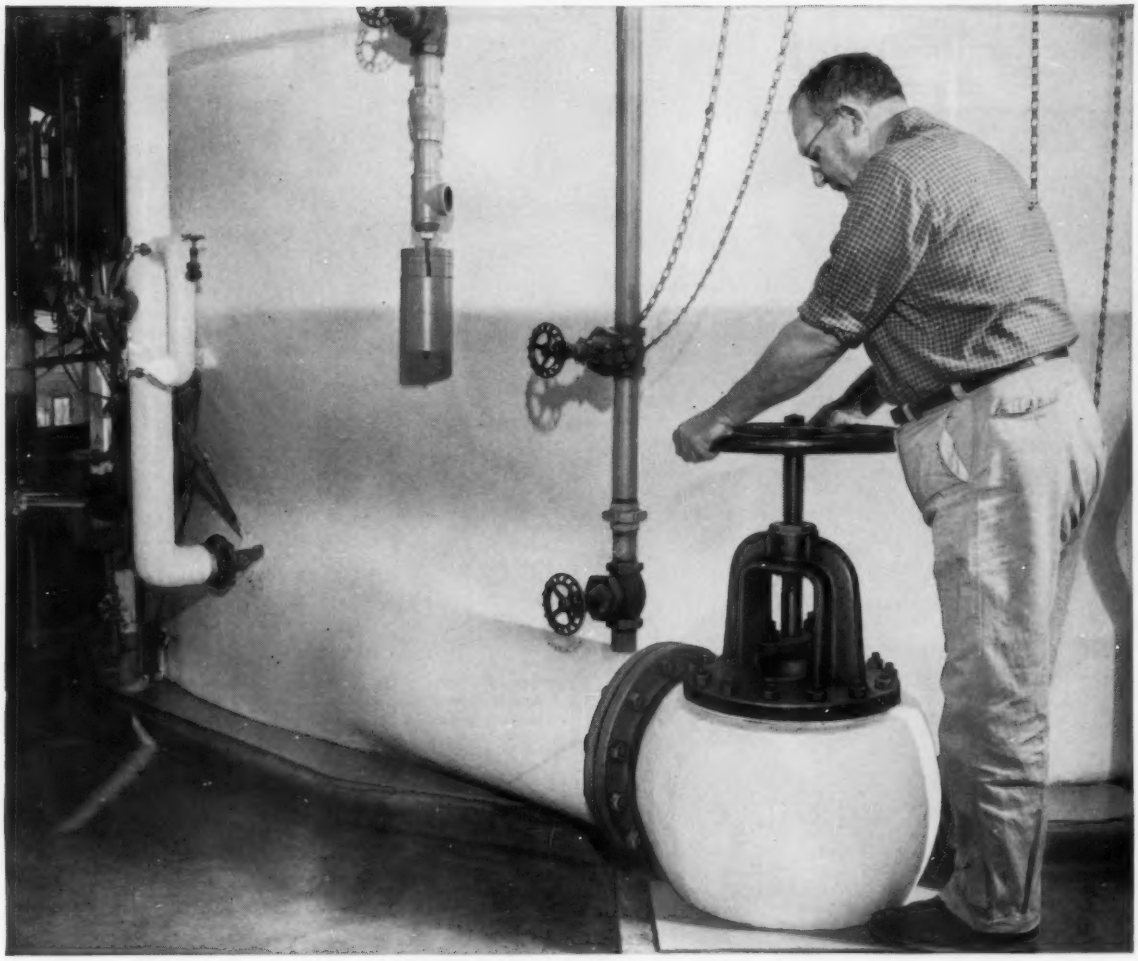
Basically, Flip Seal serves the same purpose as other electrical connectors. However, it has several features in design which offer increased protection. A flexible rubber lip has been incorporated over the female component of the connector. This flips over the male component to assure a positive sealing and locking-type action. Cable entrances are also provided with a sealing action at both ends of the connector, so that the cable entrances fit snugly around the wire—to seal out moisture, dust, dirt and metal particles. At the same time, says manufacturer, Flip Seal also provides considerable protection against shock and abuse.



The connector components are molded of rugged phenolic and encased in a rubber or Neoprene housing. Tests are reported to indicate that use of these connectors is ideal in conditions where accidental damage, excessive moisture, accumulation of oils and greases, and climatic conditions exist. Ten connectors in the Flip Seal line are now available in the rubber version or the oil-resistant grease-proof Neoprene variety. Rodale Mfg. Co., Inc.

6—STEPLESS CONTROL for overhead handling cranes

Based on the principle of electronics and using gas-filled tubes in the control circuit, this new control scheme for overhead electric traveling cranes reduces the number of mechanical contactors, it is stated, and thus eliminates a source of maintenance required. Applied in conjunction with company's standard P & H Magnetorque, this electronic stepless control is designed to provide an infinite number of speed variations, on all motions, thereby offering precision control and spotting in both lowering and hoist-



This Crane valve at Imperial Sugar has a sweet performance record

Six years of trouble-free performance are behind this Crane valve. It's a No. 353 12-inch iron body angle pattern.

Since 1949, this valve has been on 10 to 15 psi. steam service at 350° F., in the Imperial Sugar Co. refinery at Sugar Land, Texas—with no leakage, no service repairs, no maintenance of any kind. The valve is operated 2 or 3 times a week. Today, closure is just as tight and sure, and operation as easy and smooth, as the day it was installed.

Actually, this is only an average performance record for Crane valves on steam service. Every dimension, every design feature built into these rugged valves is precision-engineered for years and years of trouble-free operation.

It's just good sense not to take chances in selecting valves for steam service. Specify Crane and make sure you're getting the best valves made—backed by the world's greatest experience in the valve field, with the broadest line of all to choose from and the finest materials available today. Get full information from your local Crane Representative, or write to the address below.

CRANE VALVES & FITTINGS

PIPE • KITCHENS • PLUMBING • HEATING

Since 1855—Crane Co., General Offices: Chicago 5, Ill. Branches and Wholesalers Serving All Areas

For more facts circle 582 on Reply Card

Use SAFETY GRIP-STRUT grating

Wherever a safe footing is required

Grip-Strut circular stairway on Shell Oil tank in Portland, Ore.

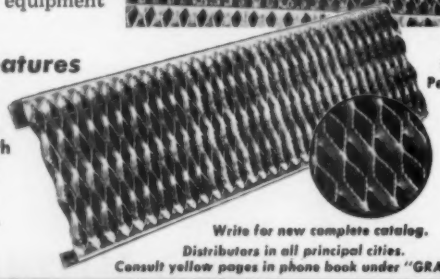
See how Shell Oil uses Grip-Strut for a safe ramp between tanks.

View looking down circular stairway on Shell Oil tank shown above.

SAFETY GRIP-STRUT is the new basic material, all in one piece (including channels), not welded, riveted or expanded in steel or aluminum, in standard sizes and gauges. Safety GRIP-STRUT presents an open space, in a diamond pattern, in excess of 55% of the area for ready access of light and air and gives a positive NON-SKID footing in all directions. Ideal for work platforms, stair and ladder steps, flooring, balconies, catwalks, machinery guards, fire escapes and for original equipment safety treads.

Important Safety Features

- ★ Fire proof
- ★ Slip proof
- ★ Maximum strength
- ★ Minimum weight
- ★ Easy to stand on
- ★ Cool in summer—warm in winter



Pat. Pending

Write for new complete catalog.
Distributors in all principal cities.
Consult yellow pages in phone book under "GRATING"

GRIP-STRUT division
THE GLOBE COMPANY • *Manufacturers since 1914*
4016 S. PRINCETON AVE. • CHICAGO 9, ILL.

For more facts circle 583 on Reply Card

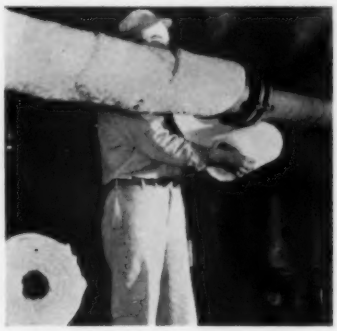
NEW PRODUCTS

(Begins on page 156)

ing directions under conditions from no-load to full-load. Also, it is claimed that hoisting and lowering speed are stabilized, to a degree not previously achieved with a-c control schemes, resulting in an almost flat speed-torque curve. According to company, this control also provides plugging protection so that motors may be reversed from the full position in one direction to that of the other direction without danger of damage. Harnischfeger Corp.

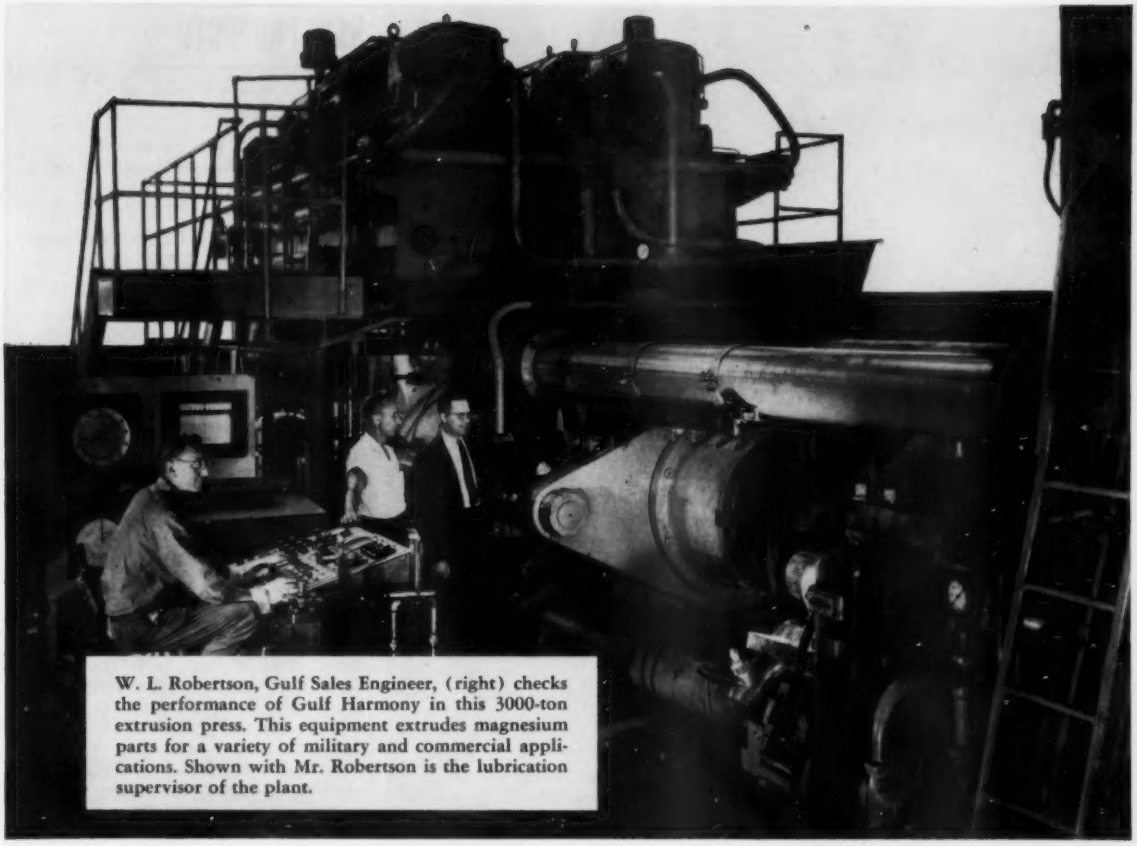
7—INSULATING BLANKET for higher temperature use

Made of fine, closely intertwining aluminum silicate fibers, the Fiberfrax Blanket is said to keep its form and properties despite elevated temperatures—the material will stand 2300 F, says company. Because of its insulating qualities, a high thermal gradient through a minimum thickness of the blanket is effected, it is noted. Applications for the blanket include high pressure steam lines, diesel exhausts, gas turbines and furnace ducts. Because it possesses high chemical stability, the material is also suggested for insulation lining in alloy and refractory furnaces. It comes in 25-ft rolls, is 12 in. wide and ½ in thick. The Carborundum Co.



8—INDUSTRIAL GASKETING impregnated with Teflon

Announced as possessing outstanding chemical and physical properties and economy advantages, Teflon-Vistex is a high pressure sheet stock laminate consisting of plies of mechanically interlocked synthetic fiber felt impregnated with Teflon resin. This development makes the exceptional thermal and chemical properties of Teflon available in a gasketing material with low cold flow characteristics. Gaskets come in two types which differ in their gasketing action and compressive resilience properties. Type "W" is a tough, high tensile strength material for general purpose application. Type "NS" is a moldable material for applications involving irregular flange surfaces and pressures. Both



W. L. Robertson, Gulf Sales Engineer, (right) checks the performance of Gulf Harmony in this 3000-ton extrusion press. This equipment extrudes magnesium parts for a variety of military and commercial applications. Shown with Mr. Robertson is the lubrication supervisor of the plant.

Ease your hydraulic press maintenance problems with GULF HARMONY

Like this midwestern light metals plant—and hundreds of other metalworking plants—you'll discover that Gulf Harmony is the oil that sets a new standard of performance in hydraulic equipment.

Here's why: Gulf Harmony has outstanding resistance to oxidation, high film strength, effective rust preventive and anti-foaming properties.

It prevents the formation of sludge deposits and maintains its original viscosity over long periods of time. It protects vital parts against excessive wear, even under severe conditions of pressure, speed, and temperature. And it prevents harmful rust in the system.

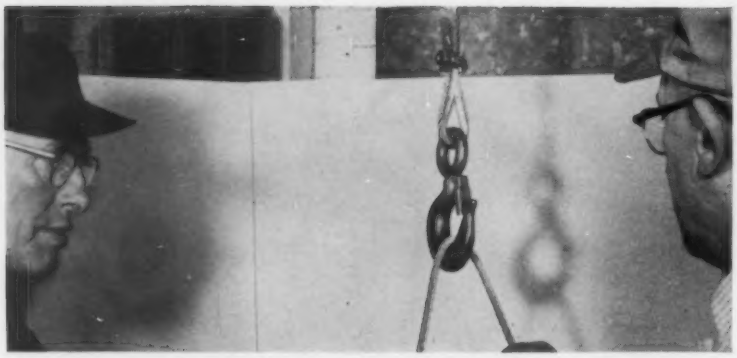
So if you are not entirely satisfied with your hydraulic oil, ask a Gulf Engineer to recommend the proper grade of Gulf Harmony. Consult the local phone directory for the number of your nearest Gulf office.

GULF OIL CORPORATION
1822 GULF BUILDING

GULF

GULF REFINING COMPANY
PITTSBURGH 30, PENNSYLVANIA

For more facts circle 584 on Reply Card



LOADS STAY PUT!

Anyway you handle it—rough or easy—your load can't come off the hook when your crane or hoist is equipped with a Laughlin Safety Hook! When the load is set down, your sling or ring won't slip off the hook until *you* release it! Designed to strict specifications, the hook is drop forged and heat treated. The fool-proof latch mechanism that maintains maximum throat width is made of long life stainless steel—it'll never rust, never jam!

Non-Sparking Safety Hooks are also available for your hazardous atmosphere applications. Your distributor can give you the complete story.

You'll find Laughlin fittings—the world's most complete line of fittings for chain or wire rope—fully described in the catalog available from your nearby distributor or from the Crosby-Laughlin Division.

TAKE IT (UP) EASY

Big hex ends of Laughlin Turnbuckles make them easy, fast and safe to take up with a standard wrench. Exclusive Laughlin eye design takes the ear of a shackle one size smaller, yet is stronger than conventional eyes because it conforms more closely to the line of pull. This same design feature also makes it easier to attach thimbles and other fittings. You can get Laughlin Drop Forged Turnbuckles in any combination of hooks, eyes and jaws in a complete range of sizes.

SAFETY IS NO SECRET

You're free from worry, your workers free from danger when Crosby "Load-Rated" Crane Blocks are part of your rigging. There's no chance to overload the block by mistake because the load capacity is plainly visible on the side plate! The rated capacity *can't* be a secret when it's in sight! Workers all over the nation are protected by Crosby "Load-Rated" Blocks—are yours?

NEED A SLING FAST?

Time-consuming, expensive welding or blacksmithing is no longer necessary when coupling chains to fittings. You can make slings in minutes at lowest cost by using Laughlin's heat-treated Double Clevis Links. They'll couple ¼" to ½" standard and alloy chains to rings, end and sling links, eye hooks, pad eyes, and other fittings.

Stocked and sold by leading distributors everywhere

CROSBY-LAUGHLIN *Division*

American Hoist and Derrick Company

FORT WAYNE 1, INDIANA

For more facts circle 585 on Reply Card

NEW PRODUCTS

(Begins on page 156)

types lend themselves to fabrication as precision cut gaskets, strips and washers, and come in thicknesses from 1/64 to 1/16 in. American Felt Co.

9—REPAIR PROCESS for castings, now in kit form

The Chain-Lock method for cold repair of cracked or broken castings is now available in kit form, so that repairs can be made by anyone equipped with the kit. In it are all tools, equipment and instructions necessary to repair engine blocks,

cylinder-valve ports, housings, other castings. In use for many years, the process formerly was available only from licensed shops. Repairs made by it are claimed water and pressure tight, resistant to extremes in temperature and the strains of expansion and construction. Company says that such repairs meet insurance approval and requirements of service inspections. Repairs are made without heating, welding or brazing. It is explained that the Chain-Lock method binds and locks the two sides of the crack or break together, then seals it. Chain-Lock Process Co.

10—HYDRAULIC PUMP is air powered unit

No. P7A, an air operated pump, is usable with all of this manufacturer's single and two-way Simplex Re-Mo-Trol Rams. It lifts seven times faster than a hand pump, says company; it has a displacement of 42 cu in. of oil per minute and will raise a 60-ton capacity ram 1 in. in 20 sec. When used with the rams, this pump provides combination units with capacities from 10 to 600 tons. The pump is designed to provide 11,000 psi hydraulic pressure at 90 psi air pressure to move heavy loads smoothly, while the operator remains a safe distance away. The pump weighs 44 lb and its oil reservoir holds 4 qt. Bulletin "Hydraulic 56" provides data. Templeton, Kenly & Co.

11—EXPANSION MATERIALS make good joints

Unusually good bond to concrete, steel or masonry surfaces is reported for this expansion joint material. Extremely durable, it is claimed to make virtually permanent joints possible and assure a lasting seal against entry of water. It is also said to have excellent squeeze and stretch characteristics to minimize any defects caused by expansion and contraction due to temperature changes. Two

(Advertisement)

NEW PRODUCTS

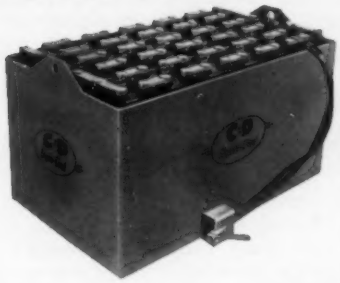
C&D introduces new 60 A.H. truck battery

In its new industrial truck battery just introduced, C & D Batteries has succeeded in increasing capacity by 20% without increasing size of the standard battery tray.

According to the manufacturer, electrical industrial trucks can now be operated on a much longer work cycle before batteries require recharge.

Exclusive Five-Fold Slyver-Clad® construction reduces 'shedding' of active plate material and permits use of the former sediment space for longer, more powerful plates.

C&D boosts battery standard to 66 A.H.



C & D Batteries, Inc., is now starting full-scale production on two high capacity lines of industrial truck batteries, which had previously been produced in limited quantities for field testing purposes.

The lines, called the 'HA' and 'HB', feature Five-Fold Slyver-Clad® construction. This construction, consisting of five separate layers of insulation, is said to virtually eliminate the need for sediment space.

By filling most of the unneeded sediment space with longer and thicker plates, these batteries provide 10% more capacity in the standard size trays approved by the Industrial Truck Manufacturers Specifications. In truck operation, this means at least a 10% longer duty cycle.

First with a '60'!
First with a '66'!
C & D pioneered the extra-capacity 60 A.H. battery back in 1945. Today, C & D packs 66 A.H. in the same size tray.

C&D boosts battery capacity over the magic margin... to give full shift operation with electric lift trucks!

No more "tired" batteries toward the end of the day! No more slow-downs before the shift is over!

First to increase battery capacity and establish the 60 ampere hour standard back in 1945—C & D is *first again* with an additional power boost. The *Slyver-Clad*® 'HA' now packs 10% extra power (66 A. H.) in the standard-size 60 A. H. tray. C & D's *Slyver-Clad* 'HB' packs 125 A. H. in the standard-size 100 A. H. tray.

Advantages are obvious. Your trucks work longer . . . stronger . . . give you a full day's work before requiring recharge. You have power to spare—all during the shift!

Read all the details in Bulletins IT-517/Rev. 56 and IT-520/Rev. 56. Write for copies today!

C&D BATTERIES, INC.
of Conshohocken, Pa.
INDUSTRIAL BATTERIES SINCE 1906
50th ANNIVERSARY
SALES AND SERVICE OFFICES IN PRINCIPAL CITIES FROM COAST TO COAST
For more facts circle 586 on Reply Card

POSITIVE

APPROACH

TO PRODUCTION PROBLEMS

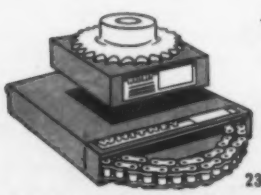
Whitney Chain Drives

Transmit one or hundreds of horsepower . . . provide split second timing motion . . . keep conveyor systems operating! Whatever your design requirements, Whitney's complete, versatile line of finished steel chain drives simplify production problems and slash costs. Whitney Chain Drives are proven by countless industrial cost and performance records on all type equipment. Operating long or short centers, driving shafts clockwise or counterclockwise, singly or simultaneously . . . Whitney Chain and Standard Attachments offer adaptability to meet your toughest demand.

Whitney Chain brings you lowered costs, thanks to a "built-in" ruggedness acquired by 60 years' design and manufacturing experience. Whitney was first in the use of alloy chain . . . and in many drive developments including the recently introduced Self-Lubricating Roller Chain.

Whitney field engineers throughout the U.S. can help solve your drive problems. Your nearby Whitney distributor provides "off-the-shelf" service for fast replacements.

Catalogs on request —



Whitney

CHAIN COMPANY

232 HAMILTON STREET • HARTFORD 2, CONN.

CREATORS OF SELF-LUBE CHAIN

ROLLER CHAIN • SILENT CHAIN • CONVEYOR CHAIN • SPROCKETS • FLEXIBLE COUPLINGS

For more facts circle 587 on Reply Card

NEW PRODUCTS

(Begins on page 156)

types are offered. One of these, Hornex 56, is based on a latex type elastomer, with strands of jute rope as filler. The other type, Hornflex, is formulated with thiokol and jute filler and is suggested for use where special adhesion problems exist, or excessive expansion and contraction anticipated. A. C. Horn Co., Inc.

12—CIRCUIT BREAKER offers dual voltage protection

This dual-rated circuit breaker is offered for protection of equipment designed to operate on either of two different voltages—such as 6 and 12 v d-c or 110 and 220 v a-c. Each breaker has two ratings, for example: 2 and 4 amp, 5 and 10 amp etc., with separate load connections for each rating. Although most ratings supplied to date have had current ratios of two to one, the company says it can manufacture circuit breakers with current ratios of up to four to one. Minimum and maximum ratings are 1 amp and 40 amp. It is explained that due to hydraulic-magnetic operation, ratings are unaffected by ambient temperatures. Dual-rated circuit breakers are available with one of three inverse time-delay characteristics or in an instantaneous-trip form. Maximum voltage is 480 a-c, 125 d-c. As yet manufacturer has not standardized on any particular rating, and will evaluate individual requirements. Bulletin 3430 gives data. Heinemann Electric Co.

Use the Reader Service Cards provided on pages 241-242 to ask for more information on these products. Circle item numbers of products in which you are interested.

13—CONTROL SYSTEMS for push-button operations

A method by which plant engineers can select from a series of 21 standard "building block" components an electronic control system to regulate push-button manufacturing operations from remote points is announced. According to company, the modular units are inexpensively mass-produced, are hooked up by plug-in units which can be expanded or regrouped, and utilize a single standard communications channel to handle hundreds of control and supervisory functions, even at distances to hundreds of miles, at major economies.

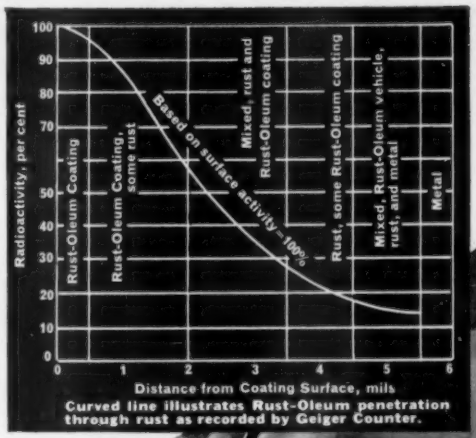
Five standard control systems are available utilizing the modular units: automatic alarms; remote metering; discreet control; proportional control; and transmission systems. They are described as complete, integrated systems with all needed components supplied. Installa-

RUST-OLEUM®

PENETRATION

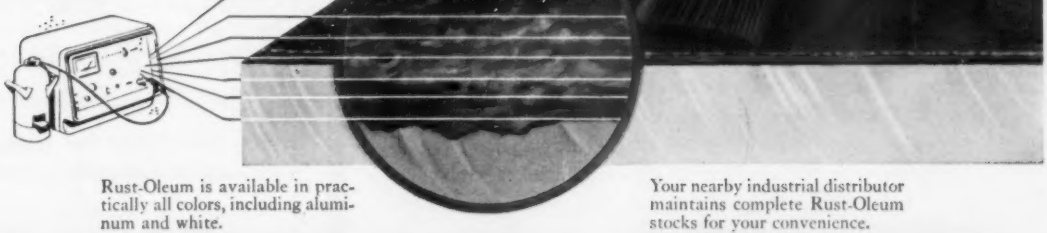
through rust to bare metal traced by Geiger Counter. To effectively stop rust—the vehicle of a protective coating, when applied over a sound, rusted surface—must penetrate through the rust down to bare metal. **Rust-Oleum does exactly that!—as proved by radioactive research!** Rust-Oleum's specially-processed fish oil vehicle was radio-activated and formulated into Rust-Oleum 769 Damp-Proof Red Primer—then applied to rusted test panels. Penetration *through rust* to bare metal by Rust-Oleum's specially-processed fish oil vehicle was then traced by Geiger Counter.

You stop rust, because Rust-Oleum's fish oil vehicle soaks deep down to bare metal and into the tiny pits where it drives out air and moisture that cause rust. You save, because this same *penetration* enables you to apply Rust-Oleum directly over rusted surfaces—usually eliminating costly surface preparations. Attach coupon to your letterhead for your thirty-page report entitled, "The Development of a Method To Determine The Degree of Penetration of a Rust-Oleum Fish-Oil-Based Coating Into Rust On Steel Specimens," prepared by Battelle Memorial Institute technologists.



Curved line illustrates Rust-Oleum penetration through rust as recorded by Geiger Counter.

There is only one Rust-Oleum. It is distinctive as your own fingerprint. Accept no substitute. Buy—and specify only Rust-Oleum. You'll be happy that you did.



Rust-Oleum is available in practically all colors, including aluminum and white.

Your nearby industrial distributor maintains complete Rust-Oleum stocks for your convenience.

RUST-OLEUM®

STOPS RUST!

See our Catalog in Sweets, or write for complete information.

ATTACH TO YOUR LETTERHEAD—MAIL TODAY

Rust-Oleum Corporation
2726 Oakton Street
Evanston, Illinois

- ☐ Complete literature including color charts.
- ☐ Thirty-page report on Rust-Oleum penetration.
- ☐ Nearest source of supply.

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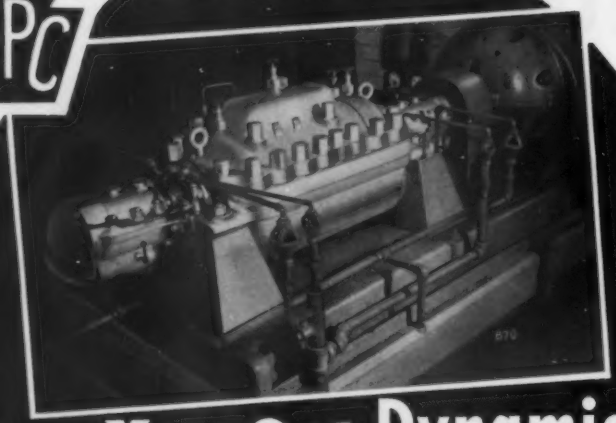
PPC



You Get Dynamic Hydraulic Balance with

Pennsylvania
Multi-Stage
THRUSTFRE
Centrifugal Pumps

All axial forces are balanced in this THRUSTFRE design. Thru the correct design of the shaft bushing between the opposed impellers, external thrust-control devices are eliminated. This dynamic, hydraulic balance design reduces parts subject to wear and replacement, gives greater operating economy, assures dependable service with minimum maintenance. Write for descriptive bulletin A-242 that shows you too can profit by the many exclusive features found in Pennsylvania Multi-stage Thrustfre Centrifugal Pumps — performance proved in hundreds of installations.

Discharge pressures to 1200 psig.

PENNSYLVANIA PUMP & COMPRESSOR COMPANY

Main Office & Works, Easton, Pennsylvania

HAE-PP326-856 **EARNING CONFIDENCE SINCE 1920.**

PENNSYLVANIA
PUMP AND COMPRESSOR COMPANY

For more facts circle 589 on Reply Card

NEW PRODUCTS

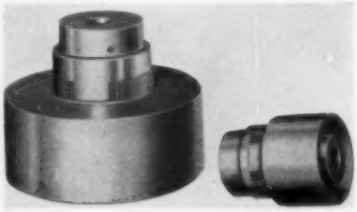
(Begins on page 156)

tions can be made by a plant electrician, it is stated. The systems are designed to function over telegraph and carrier circuits and co-axial cable to span long distances or difficult terrain, radio and VHF, UHF and micro-wave circuits can be utilized.

Suggested applications for the systems include remote control and supervision of unattended high-power pumping stations in water works; control over power transmission lines, chemical processing plants, many mass-production processes where control and supervision are required for complicated machinery. Sparton Control Systems Div., The Sparks-Withington Co.

14—FLEXIBLE COUPLING has space-saving feature

Incorporating a brake drum flange on the outer diameter, this coupling provides a compact drive arrangement and is particularly useful where shaft length or



distance between two units is at a premium. In effect, company notes, brake drum entails no more space than required by flexible coupling. Brake drum coupling is available in eight standard sizes, with horsepower ratings from 2 to 40 at 1750 rpm. Maximum bores of hub body range from 1 to 2½ in. Drum body bores are made to motor shaft size specifications. Distance between shafts runs ½ to 1⅝ in. Cushions are one-piece spider type. Lovejoy Flexible Coupling Co.

15—CONTROL for automatic rotary register burners

Fireye System FP-2, Model 1012 is announced as a primary control that programs and safeguards the entire operating sequence of fully-automatic rotary register oil and gas burners. It uses two flame-sensitive scanners—one to monitor the pilot flame and supervise light-off sequence, the other to safeguard the main flame. This arrangement is designed to provide additional safety against off-ratio firing. According to manufacturer, the programming sequence offered in this system was especially developed for rotary register burners. To assure adequate air flow through the furnace for purging, air dampers or louvers are driven toward the open position for 15 sec, then back to the light-off position prior to each light-off.

As another feature, the modulator switching circuit accommodates any line,

JalKlamp splices

have full rope strength

Now you can cut wire rope sling costs and still get stronger, safer slings with JalKlamps, the new special alloy sleeves for wire rope splicing.

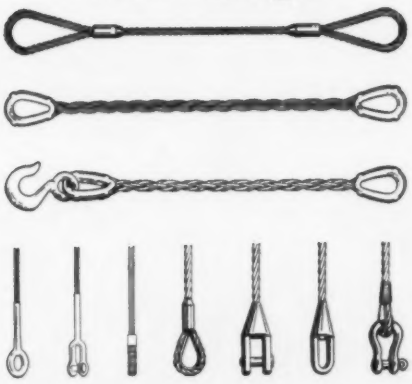
When hydraulically pressed around the rope, the JalKlamp's non-corrosive alloy actually flows into every space between the wires and between the strands of the rope. Result: a neat, permanent, watertight splice that develops the full strength of the rope.

JalKlamp slings and terminals are available in all standard wire rope constructions with diameters from 1/8" to 2". They're part of a full line of JalFlex Slings and Fittings including all types of braided slings and swaged fittings that can meet your individual wire rope assembly requirements.

Write for complete information on the JalFlex Slings and Fittings today.

Designs for Every Need

JalFlex Slings and Fittings



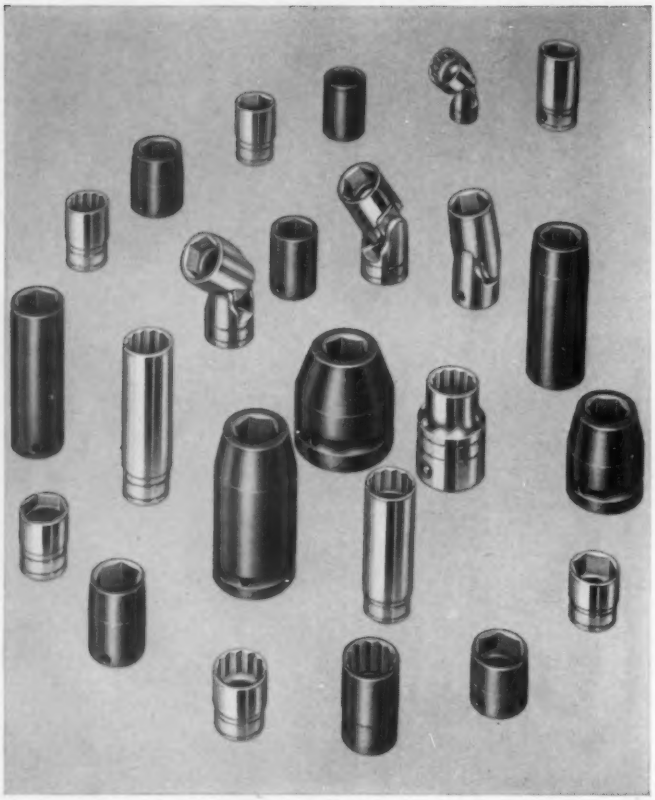
Jones & Laughlin

STEEL CORPORATION · PITTSBURGH

STEEL

For more facts circle 590 on Reply Card

what? all these Snap-on sockets to drive just one size nut?



yes — **AND HERE'S WHY:** Every ¾-inch socket shown here solves a particular industrial nut-running problem. *Snap-on* makes this variety of ¾-inch hex wrench sockets and many more sizes and styles to give you just the one you need to match the job you have to do. Standard length, bolt clearance length, magnetic, Flexockets, power, power-impact and thin-wall types let you choose the socket to do your job faster and more efficiently, with less breakage.

ASK YOUR Snap-on MAN — If you have a production or maintenance problem involving special socket design or application, or any other question on tools, talk it over with your *Snap-on* man. He is a specialist who devotes all his time to industrial application of *Snap-on* tools. Write us or call your nearest *Snap-on* branch. Free catalog of industrial wrenches and hand tools is yours for the asking.

SNAP-ON TOOLS CORPORATION
8060-I 28th Avenue • Kenosha, Wisconsin

Snap-on Tools FOR ALL INDUSTRY

*Snap-on is the trademark of Snap-On Tools Corporation.

For more facts circle 591 on Reply Card

NEW PRODUCTS

(Begins on page 156)

low-voltage or pneumatic firing-rate control system. During normal operating procedure, this control provides for prepurge, pilot proving, limited trial-for-ignition of main fuel and post-purge periods, it is explained; if a flame failure occurs during start-up or operating periods, fuel is shut off within a second. Bulletin CP-32 gives details on this. Electronics Corp. of America.

16—INDICATOR LAMP has a built-in "checker"

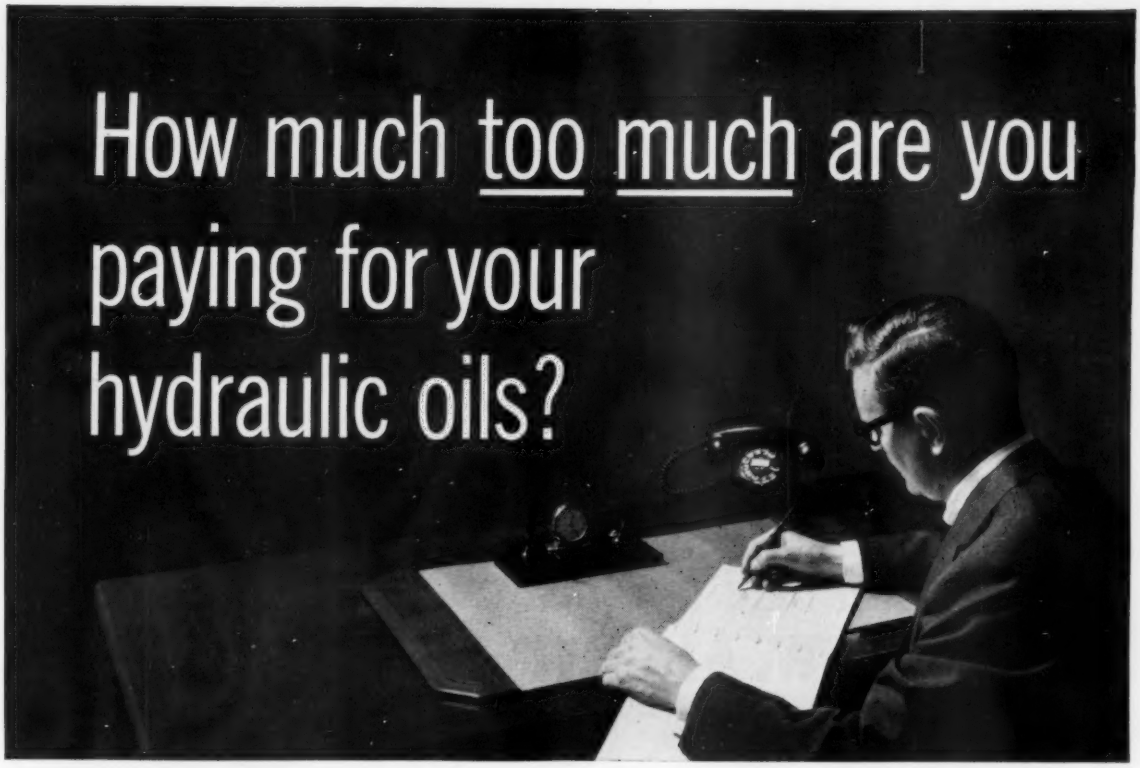
When control circuit trouble is suspected, this "push-to-test" oil-tight indicating light lets you check whether an unlit indicator lamp is an indication of trouble or merely the result of a lamp failure. By pressing the lens of this light,

you transfer the lamp from its normal circuit to a separate built-in lamp test circuit. If the lamp is functioning, it lights normally to indicate that trouble shooting is in order. If it fails to light, replacement of the lamp is possible with minimum loss of time. These indicating lights are of the transformer type, may be had for 110-, 220-, and 440-v applications. Open, cover, or panel-mounting units are available and company says that dimensions are identical with standard units of corresponding types. Westinghouse Electric Corp.

17—PUMPING UNITS, single or duplex, for condensate

For both closed low pressure steam heating systems or process equipment, and for boiler feed condensate return, these pumps are available in single or duplex units. Straight condensate return units receive, and automatically return to boiler, the condensate from various types of low pressure heating systems and equipment. Used in closed systems with no appreciable loss of steam, this unit serves to return water before it loses heat. It consists of a receiver tank to which is connected a close-coupled centrifugal pump, electrically controlled by a float switch actuated by water in the tank.

The boiler feed condensate return system automatically blends raw make-up water with hot return condensate injected into boiler to maintain water line at an even rate. Admittance of fresh water is



Puropale RX costs less, yet meets exacting requirements of leading machine builders

You would be interested in economizing on such an important lubricant as hydraulic oil only if you could be sure of *complete satisfaction*. And now it's possible with PUROPALE RX, the premium Pure Oil product that costs less, yet meets *all* the specs of leading industrial machine builders.

PUROPALE RX is equal in quality to many steam turbine oils as evidenced by these plus performance features:

HIGH VISCOSITY INDEX—Minimum V. I. of 90 insures greater resistance to change in viscosity over wide temperature range.

GREATER OXIDATION RESISTANCE—Removal of unstable compounds by special refining methods and addition of powerful oxidation inhibitors insures freedom from sludge and gum.

PREVENTS CORROSION—Passes copper strip corrosion test (3 hours at 212° F.).

GREATER RUST PROTECTION—Special rust inhibitor "plates out" on vital machine parts protecting them against rust. Passes A.S.T.M. and Navy rust tests.

ANTI-FOAMING properties insure constant full lubrication protection.

CORRECT VISCOSITY—PUROPALE RX oils are available in a wide range of grades. There's one that's just right for your needs.

Discover how much you can save by using PUROPALE RX oils in circulating or hydraulic systems of your machine tools. Call your nearest Pure Oil office today.

BE SURE PURE WITH PURE

The Pure Oil Co.
35 E. Wacker Dr.
Chicago 1, Ill.

For more facts circle 592 on Reply Card

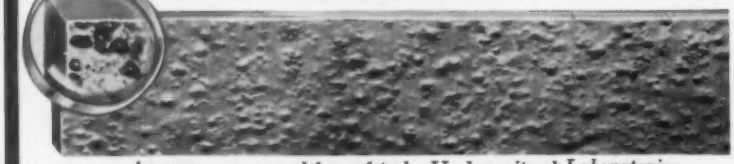
The Accident did NOT happen
thanks to A.W. ALGRIP
World's only abrasive rolled-steel floor plate

No production slow-up or excess overtime, either—because ALGRIP'S thousands of tiny abrasive friction particles prevented slipping.

Nationwide, ALGRIP—made by a patented process—is cutting accident rates, slashing insurance costs. This easily fabricated, super-safe flooring is tough steel into which a grinding wheel type abrasive has been rolled—*not coated*—to uniform depth as an integral part of the steel. Hard usage merely exposes more abrasive for extra long life.

Make a test installation of ALGRIP in your *worst* slipping area—use it as an overlay or as complete flooring. It will pay for itself as you watch accident rates tumble and morale improve. Call or write today for detailed booklet.

A.W. ALGRIP ABRASIVE ROLLED STEEL FLOOR PLATE



ALGRIP—approved for safety by Underwriters' Laboratories

ALAN WOOD STEEL COMPANY
Conshohocken, Pa.

Please send A.W. ALGRIP Booklet AL-29

Name_____

Title_____

Company_____

Address_____

City_____ Zone_____ State_____

Other Products: A. W. SUPER-DIAMOND Rolled Steel Floor Plate—Plates—Sheets—Strip—(Alloy and Special Grades)

For more facts circle 593 on Reply Card

NEW PRODUCTS

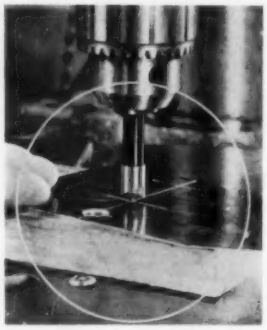
(Begins on page 156)

controlled by make-up valve on the receiver. These units consist mainly of a receiver tank with a close-coupled centrifugal pump attached.

Duplex units have two pumps which, in straight condensate return systems, alternate in operation. On boiler feed condensate return systems, operation of pumps is governed by boiler level control which is attached to boiler. Receivers in both return systems vary in capacity with 7, 14, 40, 60 and 100-gal units. Gould Pumps, Inc.

18—TOOL drills light materials, even shim stock

In thin materials—0.001-in. to 10-gage—round, perfectly sized holes can be drilled in sheet steel, aluminum, brass, copper, hard rubber, rigid plastics, hardboards, paper and cardboard with the Roto-Bor, it is announced. This tool cuts from the outside of the circle in,



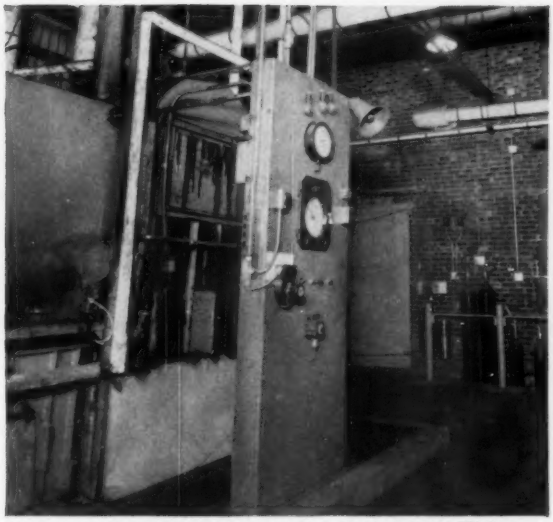
instead of the inside-to-outside method. The result is claimed to be an accurate hole without distortion and almost burr-free, made with portable or stand drills at drill press speeds. It is pointed out that because practically no torque is developed by the cutting process, work may be held by hand.

The Roto-Bor has an axially retractable center point which facilitates accurate positioning and which is also removable, so tool may be resharpened. It is available in single tools or sets in sizes $\frac{1}{32}$ in. over standard from $\frac{3}{16}$ to $\frac{3}{4}$ in. and in larger special sizes. Company points out that, on layout work, Roto-Bor can often eliminate jigboring, punch press set ups and sequence drilling. Jancy Engineering Co.

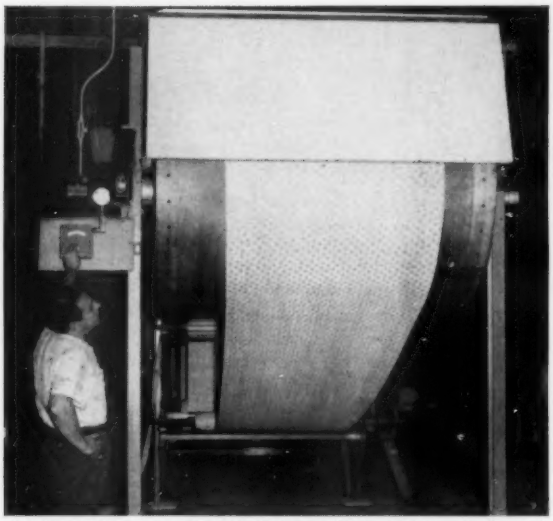
19—PYROMETER measures hot gases in difficult cases

For situations in which gas temperatures and surroundings change constantly, the Land Suction Pyrometer is designed to measure heated gas from 0 to 2900 F. It is expected to find usage in water tube boiler furnaces; uptakes and regenerators of open hearth furnaces; glass tanks. Suitable indicating and recording instruments can be used in conjunction with

Four ways to make a better product with Fenwal units



MEASURING LIQUID LEVEL IN A HOT ASPHALT TANK. High temperature and extreme viscosity of asphalt were no problem for THERMOSWITCH units in this unique application devised by engineers at the Flintkote Company. The Fenwal THERMOSWITCH units were not affected by these severe conditions, which interfere with the operation of most liquid level instruments. *Write for latest literature.*



CONTROLLING A RADIANT HEAT DRYING DRUM. A Fenwal Series 541 Indicating Temperature Controller is connected by a capillary tube to the temperature-sensing bulb, located close to the exterior surface of the drum. The Series 541 keeps the temperature of the drum surface within ± one-quarter per cent of the controller scale — outstanding performance for processing equipment of this type. *Write for latest literature.*

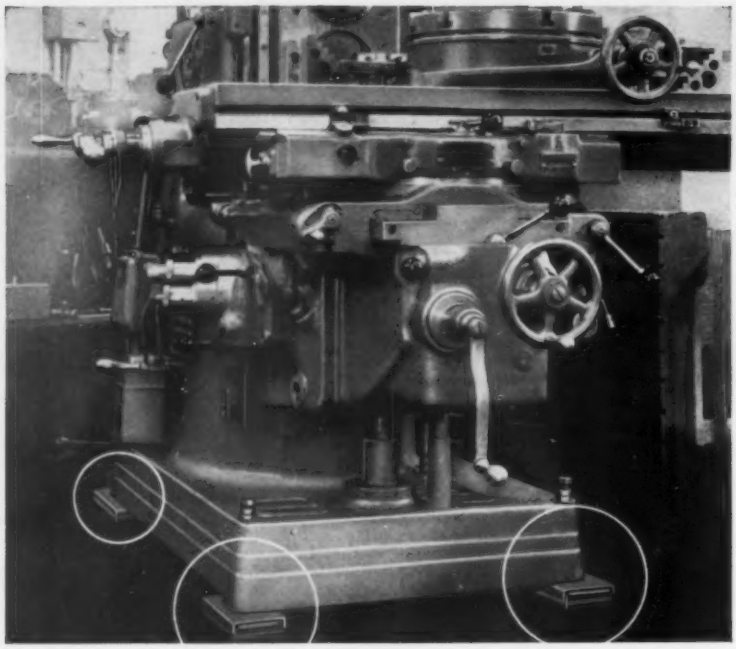
PREVENTING COLD STORAGE DOORS FROM FREEZING. Jamison Cold Storage Door Company's heating unit "Frostop" uses a Fenwal 17000 THERMOSWITCH unit to control the heater and prevent excessive icing. The THERMOSWITCH unit's external, single-metal shell expands or contracts *instantly* with temperature changes, making or breaking enclosed electrical contacts. Compact, highly resistant to shock and vibration, this unit has solved hundreds of costly problems. *Write for latest literature.*

CONTROLLING GENERAL ELECTRIC-TELECHRON TESTING TEMPERATURE CHAMBER. Fenwal's highly flexible Series 560 Indicating Controller controls a specially constructed chamber used for testing. The temperature range of the chamber is 45° to 105°F. In a recent test of Telechron's electronic clock the Series 560 was set on proportional control and controlled the temperature within a degree of the visual setting! *Write for latest literature.* **Fenwal Incorporated, 399 Pleasant St., Ashland, Mass.**

Fenwal Controls Temperature... *Precisely*

For more facts circle 594 on Reply Card

KORFUND
MACHINERY MOUNTINGS



let you INSTALL MACHINERY in MINUTES

Machinery installation need not be the tedious, time-consuming (and therefore costly) job it once was. Korfund units let you install machinery in minutes.

For example, machine tools like this precision miller need not be bolted to the floor because the LEV-ELASTO Dampers used prevent "walking". Leveling, with the built-in leveling screws requires only a wrench and a few minutes time—eliminating shims and saving both time and temper. And, as an added plus, the Dampers protect the machine from transmitted vibration that can cause rejects.

Of course, all our installations are not as simple as this—in some cases, tremendous weights are involved, or vibration problems are critical, or both. In these cases, plant engineers are enthusiastic about Korfund Steel Spring Vibro-Isolators.

Solving vibration control and machinery mounting problems is Korfund's specialty. We have more than a half-century of experience in the field. Our experience lets us recommend "the right way the first time"—no trial-and-error basis is necessary.

Write for your copy of the Korfund Plant Engineers' Guide—you'll find it full of helpful information. Ask for Bulletin 33A.

For specific recommendations contact us or one of the 46 local Korfund offices. Look under "Korfund" in your local Telephone Directory or in Thomas' Register.

THE KORFUND CO., INC.

KORFUND VIBRATION CONTROL — SPRINGS — RUBBER — CORK

48-35R Thirty Second Place, Long Island City 1, N. Y.
In Canada: 510 Canal Bank, Ville St. Pierre, Montreal

For more facts circle 595 on Reply Card

NEW PRODUCTS

(Begins on page 156)

this pyrometer, and the company can provide complete systems. Three models are offered using platinum and platinum rhodium sensing elements, each designed for a particular application and temperature range.

In operation, the device forces hot gases at high velocity past thermocouple temperature-sensing elements to increase convective heat transfer from the gas. Concentric shields protect these elements from external influences. The main unit consists of a water-cooled stainless steel jacket, 6 ft. long. (Company will supply any length from 4 to 12 ft.) A platinum thermocouple with 5 ft of spare wire in a reel box is also part of this suction pyrometer. Fielden Instrument Div., Robertshaw-Fulton Controls Co.

To receive product data circle item numbers on the handy Reader Service Cards provided on pages 241-242.

20—CLEAR LACQUER gives metal multiple protection

Expected to be of value in finishing rooms of fabricating plants handling several types of metals is Clear Universal Lacquer 100. This coating is reported to save time by eliminating the need for switching from one lacquer to another when a different metal is to be finished. Water white in color, it is said to have excellent color retention and adhesion. It forms a tough film which resists perspiration, corrosion, stain spotting, sulfur, heat and cold, says manufacturer, and it has good indoor and outdoor exposure life. The lacquer can be reduced with suitable thinners for application by spray or dipping. It dries out of dust within 10 min, hard within an hour, it is stated. A sample is offered. Fidelity Chemical Products Corp.

21—PSYCHROMETER is self-contained, motor driven

The Psychron is a compact, motor-driven portable instrument for determining relative humidity. Its applications include air conditioning, refrigeration, food processing, textile manufacturing, other jobs in which temperature and humidity must be closely checked or controlled. Powered by three flashlight batteries, the Psychron consists of a matched wet- and dry-bulb thermometer assembly ventilated by a tiny fan coupled to a motor. Accuracy of the thermometers is given as ± 0.3 deg F at any point.

Manufacturer of the instrument says that its advantages over the sling-type psychrometer include easier and safer close-quarter operation and more precise aspiration rate. It is also reported immune from radiation effects of the sun,

For more facts circle 596 on Reply Card——→

Modern

. . . P&H Hoists set the pace

Advanced design and leadership go hand-in-hand in the hoist business. That's why you'll consistently find the newest developments in overhead materials handling in P&H Hoists. We know that to hold our position of leadership, we have to maintain our reputation for being the first with engineering advances in speed . . . capacity . . . design . . . appearance.

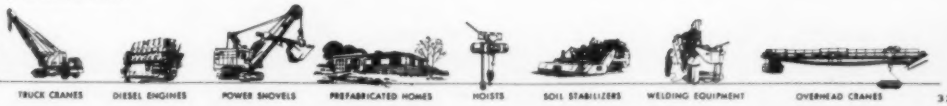
You can see the results of this striving for up-to-date methods and developments in every P&H Hoist that comes off our assembly line. Our customers see it, and recognize it in the form of additional purchases. One large hoist user alone, has equipped his plant with over 1100 dependable, hard-working P&H Hoists.

Remember, when you want a modern hoist, an up-to-the-minute hoist — specify P&H. See your nearest P&H distributor — or write us for free information regarding the type of hoist you need in your business.

HARNISCHFEGER

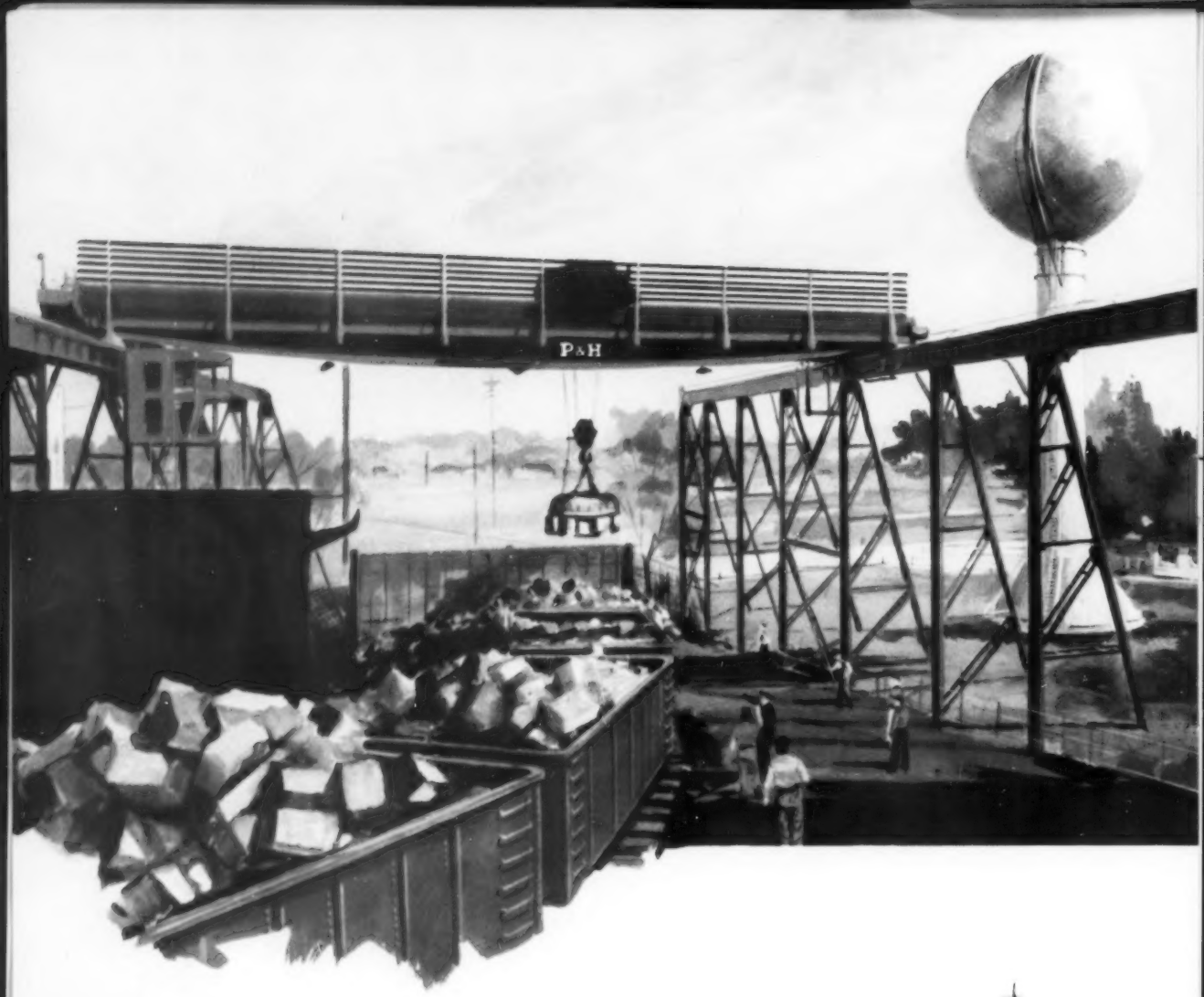
MILWAUKEE 46, WISCONSIN

the P&H *Line*



TRUCK CRANES · DIESEL ENGINES · POWER SHOVELS · PREFABRICATED HOMES · HOISTS · SOIL STABILIZERS · WELDING EQUIPMENT · OVERHEAD CRANES

3125



Modern

designs keep P&H Overhead Cranes ahead of the times

It's a tough job — keeping ahead of the times in crane design in this technological age. But P&H engineers have managed it through the years — so that P&H Overhead Cranes have the reputation of being the most advanced line in the field. Buyers know it, too — more than half the overhead cranes in use are the P&H brand.

P&H paces the field in many ways — some of them the small, apparently insignificant ways that spell better performance and easier operation. Take, for instance, the new crane cab shown in the illustration. The front of the cab is angled 30° so the operator can see what he's doing more easily. Ordinarily he has to stretch his neck to get a look at the load he's moving.

You, too, can benefit from the modern developments on the P&H Overhead Crane. Be sure to check with us before you start building, so you can get the benefit of our engineer's advice on your new installation. There is no charge for this service, of course. Just drop us a line on your letterhead.

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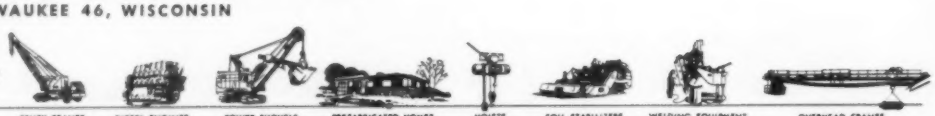
MILWAUKEE 46, WISCONSIN

the P&H Line



TRUCK CRANES · DIESEL ENGINES · POWER SHOVELS · PREFABRICATED HOMES · HOISTS · SOIL STABILIZERS · WELDING EQUIPMENT · OVERHEAD CRANES

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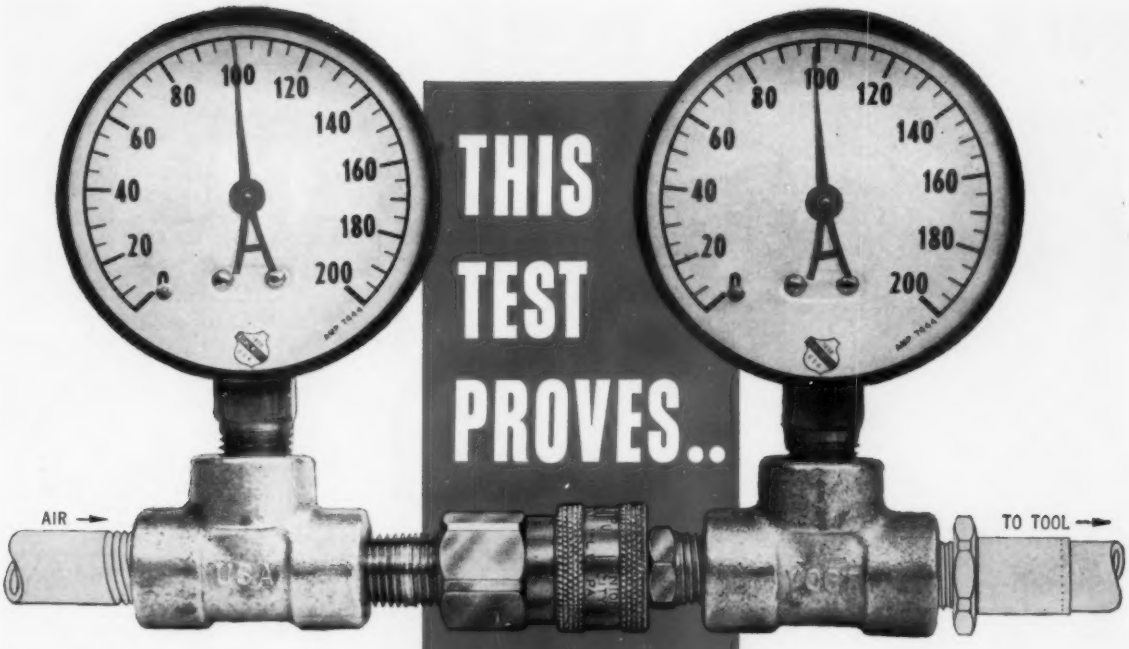


Snap-tite's quick-connect "Hi-Flow" coupling delivers maximum flow with minimum pressure drop

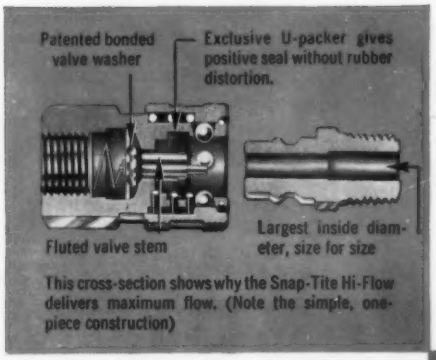
What this test can mean to you

Air tools are designed to operate most efficiently at 90 psi. For every 10 pounds of pressure drop under 90 psi your air tools lose 13% speed and power. If air pressure at your tools is below 90, in spite of a higher reading at your compressor, there are two corrective measures you can take:

One: overwork the compressor to overcome excessive pressure drop of your present couplings . . .

Or Two: install Snap-Tite "Hi-Flow" couplings at each air tool.

Tests run in plants all over America prove "Hi-Flow" couplings lose far less air pressure than any other quick-connect coupling.


Patented bonded valve washer
Exclusive U-packer gives positive seal without rubber distortion.
Fluted valve stem
Largest inside diameter, size for size

This cross-section shows why the Snap-Tite Hi-Flow delivers maximum flow. (Note the simple, one-piece construction)

COMPARE QUICK-CONNECT COUPLINGS

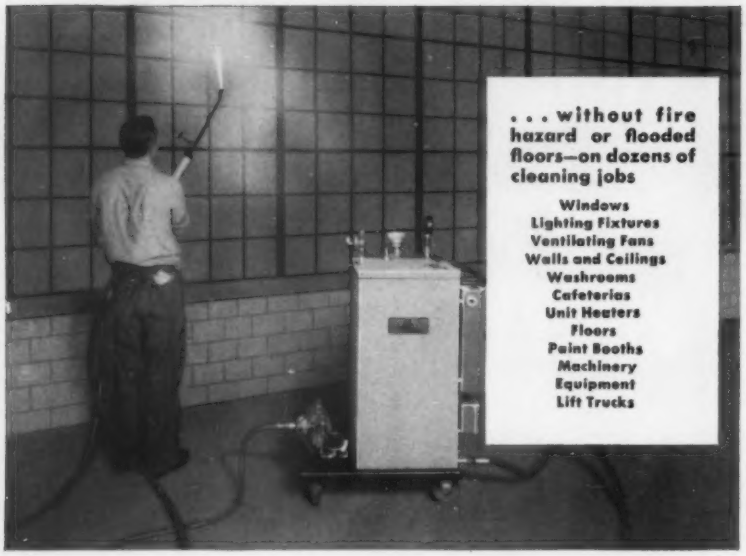
You can set up this quick-connect coupling test in 5 minutes in your plant . . . better still, let your Snap-Tite representative show how really efficient quick-connect couplings increase production and maintenance efficiency in your plant. WRITE

Snap-Tite

UNION CITY 5, PENNSYLVANIA

For more facts circle 597 on Reply Card

CUT IN-PLANT CLEANING TIME IN HALF



Pantex **SPEEDYLECTRIC STEAM-JET CLEANER**

Pays for itself in 1 year's plant housekeeping

You can make plant housekeeping jobs easy, and do them safely — during working hours — with a Speedylectric Steam-Jet Cleaner. The jet of "dry" steam and detergents quickly removes grease and dirt from walls, windows, machinery, conveyors or other plant equipment.

Often equipment cost is returned within a year, since a Speedylectric lets one man do the work of five. There's NO fire hazard — the high pressure steam is generated electrically, with no flame, no fumes. And, there's no flooding of working area.

A Speedylectric utilizes the electrode principle, simplest and lowest cost method of generating steam electrically. It's portable . . . requires practically no maintenance . . . available for 220, 440 or 550 volts AC. MAIL COUPON for bulletin.

Need High Pressure Steam for Processing?

A Pantex Speedylectric Steam Generator placed adjacent to process assures constant temperature "dry" steam, "at the flick of a switch". Low in first cost and 98½% efficient. Requires only about one-half the floor space of conventional boilers, with equal capacity. From 2 to 60 Bhp, 15 to 500 Psi.

PANTEX MANUFACTURING CORPORATION
Box 660AH, Pawtucket 9, R. I.

Send me facts and figures on:

☐ Pantex Speedylectric Steam-Jet Cleaners

☐ Pantex Speedylectric Steam Generators

Name and Title .....

Company .....

Address .....

For more facts circle 598 on Reply Card

NEW PRODUCTS

(Begins on page 156)

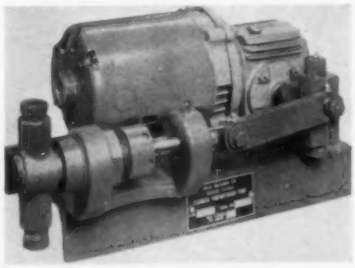
and it has a built-in thermometer illumination system for reading in the dark. The Psychron weighs 2½ lb, is 10 in. long. It operates in a relative humidity range of from 10 to 100 per cent, and a temperature range of 10 to 100 F. Friez Instrument Div., Bendix Aviation Corp.

22—MOTORIZED REDUCER has a special support

The Line-O-Motor is designed to combine advantages of integral motor-reducer units with the versatility of separately mounted motors. Reducers are equipped with a specially designed motor support bracket—reducer base supports both reducer and motor for easy set-up and shaft alignment. Motor mounting bracket slots are standardized to suit all NEMA motors. Line-O-Motor is available in horizontal models for foot mounting or in vertical and vertical extended housing models for flange mounting. Its capacity ranges from 1 to 75 hp for any A.G.M.A. service classification. Double, triple or quadruple reductions provide ratios from 5.06:1 to 238:1. Foote Bros. Gear and Machine Corp.

23—FEED PUMP for applications of 7 gph or less

Model 4411 is described as a compact and simplified chemical feed pump with a maximum capacity of 7 gph feed and discharge pressures to 600 psi. Of the



positive displacement plunger type, this pump contains built-in operational features of company's larger capacity feed pumps, such as "capsulated" construction. The pump is suggested for applications requiring precision and economy in the continuous feeding of chemicals used in water conditioning, chemical process additive feeding, petroleum inhibitor addition. Hills-McCanna Co.

24—FLEXIBLE SHAFTS for remote control of valves

Flexible shafts and terminals for remote control of valves have a core of multiple layers of high carbon wire. The casing is interlocked metal asbestos packed, in galvanized steel or phosphor bronze. According to company, this new shafting with a variety of terminals makes it possible to control any type valve from

You keep work rolling with MASONITE PRESDWOOD

Where to use Tempered Presdwood for flooring

- Finished floors
- Platforms
- Ramps
- Mats and runners
- Trucking aisles

Where to use Masonite Underlayment

- Over old wooden flooring as underlayment for finish floor coverings

Smooth the way for men and materials—with strong, dense and durable Tempered Presdwood®.

Workmen standing at machines like the "underfoot feel" of these flat, rigid and scuff-resistant panels. Trucks roll easily and quietly along aisles covered with these large panels. 4′ wide and up to 16′ long, they are easy to apply and won't split, splinter or crack. The 3/16″ and 1/4″ thicknesses of Tempered Presdwood are recommended for flooring uses.

See your lumber dealer and send the coupon for our free, illustrated booklet about all the factory uses of Presdwood, including Masonite Underlayment.

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Please send me your booklet on improving factory methods with Presdwood.

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Title.....
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City..... *State*.....
Zone..... *County*.....

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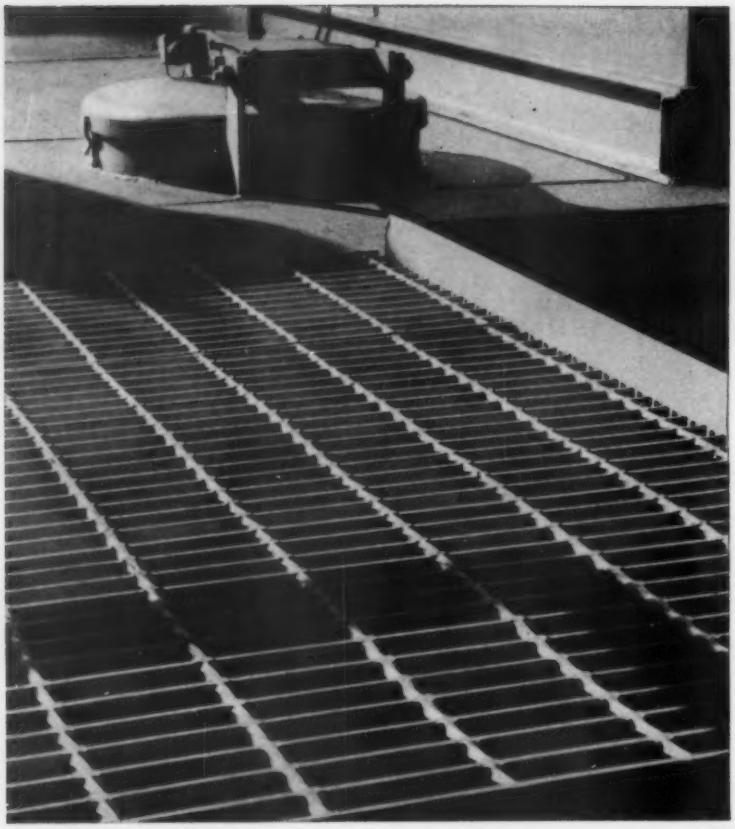


... make every step a safe step

BLAW-KNOX ELECTROFORGED®
STEEL GRATING and STAIR TREADS

Indoors or outdoors, you can provide safe walking conditions throughout your plant on floors, stair treads, platforms, walkways and catwalks. For Blaw-Knox Electroforged Steel Grating brings you these exclusive features:

1. rigid one-piece construction—easy to install
2. non-slip twisted crossbar—for safe footing
3. three types of bearing bars
   - square bars—for smoothest walking surface
   - knurled bars (Furro-Grip)—for extra safety plus relatively smooth walking surface
   - serrated bars—for maximum safety under extremely hazardous skid conditions
4. no sharp corners to clog—self-cleaning
5. all surfaces accessible—easy to paint
6. maximum open area—for light and ventilation

Write for your copy of new Bulletin No. 2486
—or send dimensional sketch for quotation.

50th Anniversary
BLAW-KNOX
1906-1956

BLAW-KNOX COMPANY
BLAW-KNOX EQUIPMENT DIVISION
Pittsburgh 38, Pennsylvania

GRATING APPLICATIONS: floors • platforms • walkways • catwalks • stair treads • fan guards • shelving • and many other uses, both outdoors and indoors, for versatile steel grating

For more facts circle 600 on Reply Card

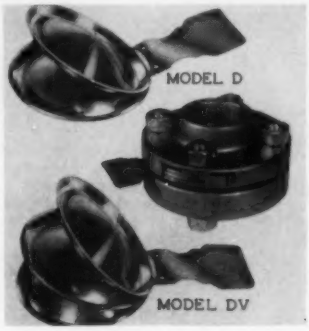
NEW PRODUCTS

(Begins on page 156)

almost any point in the plant. Plain valve couplings that can be fastened to the valve handwheel spokes are available in three types: one for rising handwheel valves, one for rising stem gate valves, one for non-rising handwheel valves. Quick disconnect valve couplings also come in the same three types. These let the coupling be disconnected quickly if it is necessary to operate the valve right at the handwheel. Manufacturer also offers clamps for fastening the flexible shaft in place, as well as piercing sleeves for going through floors. Remote control terminals for bolting in place, or for welding, are also available. The Stow Mfg. Co.

25—RUPTURE DISC to protect pressure systems

This D and DV Rupture Disc is reported to extend the advantage of safety head protection to many installations now operating under pressure, temperature and corrosive conditions too severe for many



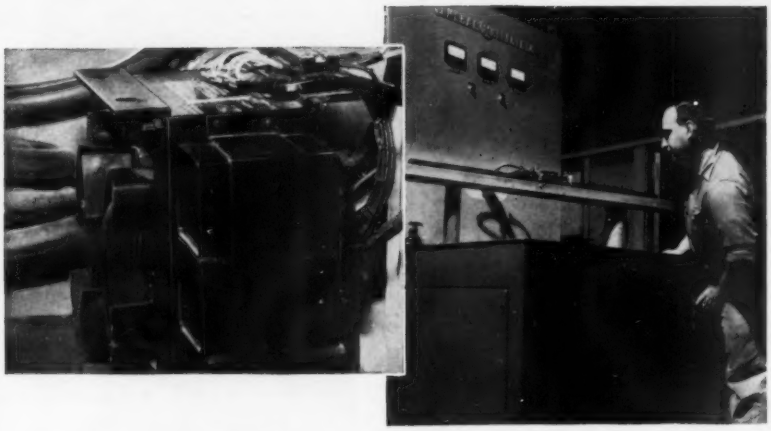
such discs. This new disc extends the range for high temperature applications, provides maximum service under pulsating or reversing pressure conditions and permits closer operation to rupture pressure, according to manufacturer. It is also said to make lower minimum rupture pressures possible and give extended service under pressure surges that approximate the rupture pressure. Full details are in Catalog 77-31. Black, Sivalls & Bryson, Inc.

26—THERMOSTAT, heavy duty, controls two circuits

Two independent electrical circuits can be controlled simultaneously with the Series 22000 Thermoswitch, it is announced. Basically this dual control thermostat consists of a liquid-filled sensing element, containing a sensitive bellows-and-push-rod assembly which actuates two precision miniature snap switches mounted in the head. Each switch may be connected to operate a separate electrical circuit. The thermostat can be specified to operate over one of the three temperature ranges: —75 to

Dry-Type Transformer NEWS

G-E voltage stabilizing transformers featured in new line of electronic induction heaters



G-E voltage stabilizing transformers in new induction heaters assure continuous production.

VOLTAGE CONTROL WITHIN ±3% PERMITS SAVINGS IN MAINTENANCE COSTS

In the design of the Company's new line of electronic induction heaters, G-E engineers considered one fact of primary importance. Fluctuating voltage of just 5% can decrease tube life in electronic induction heaters by as much as 50%. This fact prompted engineers to equip the new induction heater line with field-proven G-E voltage stabilizing transformers. G-E voltage stabilizing transformers hold tube filament voltage to ±3%. Extra-long tube life results to hold down induction heater maintenance costs, and assure continuous heat-treating in metal-working plants.

G.E. Markets New Indoor-Outdoor Dry-type Transformer

G.E.'s Specialty Transformer Department announces the availability of a new extra-quiet, indoor-outdoor 25-kva transformer. Equipped with mounting ears for convenient wall or column mounting, the transformer is specially designed for applications where moisture, dust, lint, are primary factors. Some design features: a phosphatized finish with final coat of G-E Glyptal* alkyd-resin helps prevent rust and corrosion; gaskets between cap and core and between terminal compartments and core are of special weatherproof material; heat is radiated through exposed core, thus eliminating draft through the coils (especially important where corrosive atmospheres are prevalent).

One other point: the new transformer has an unusually low noise level due to vibration-resistant construction. The transformer's low noise level makes it particularly suitable for applications in apartments, offices, hospitals, and in other situations where noise is an important factor. Section 410-22, General Electric Co., Schenectady 5, N. Y.

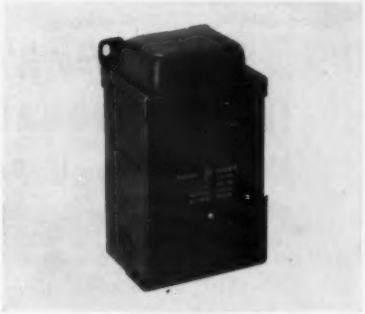
*Registered trade-mark of the General Electric Company

BUCK-BOOST TRANSFORMERS PERMIT AIR-CONDITIONING OEMS TO STANDARDIZE ON 230-VOLT COMPONENTS

Plenty of interest has been generated in the air-conditioning market by news from G.E. that users and manufacturers can standardize on 230-volt units and still operate from 208-volt distribution systems. Voltage can be boosted from 208 volts to 230 volts with General Electric buck-boost transformers available in ratings to handle any size air-conditioning unit.

Immediate advantage to the user: he can purchase standard 230-volt air conditioners at lower cost than special 208-volt units and match them to his distribution voltage.

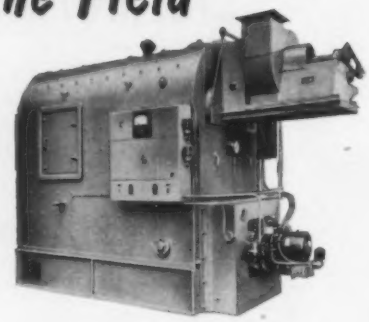
Immediate advantage to the manufacturer: he can eliminate dual inventories of 208-volt and 230-volt components.



GENERAL ELECTRIC

For more facts circle 601 on Reply Card

Compare International Water Tube Package Boilers with the Field



- Ample Furnace Volume—low heat release rates
- Convertible to Coal Firing
- Reserve Capacity Always Available
- Rapid Directed Water Circulation
- Maximum Heat Absorption—quick steaming
- Induced Draft—quiet operation
- Fully Coordinated—fire tested
- Oil, Gas or Combination Firing

Package boilers can also be shipped, less burner and controls, for installation by local contractors in accordance with International's standard package specifications.

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It will pay you to specify International, the boilers with extra profits built in. We will gladly send these International Bulletins:

No. 600 —Water Tube Package Units
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THE INTERNATIONAL BOILER WORKS CO.

Steel Firebox Heating & Power Boilers Low & High Pressure Water Tube Package Boilers • International-LaMont Forced Recirculation Generators • ASME Code Pressure Vessels & Welded Products.

820 Spruce St. East Stroudsburg, Pa.

For more facts circle 602 on Reply Card

NEW PRODUCTS

(Begins on page 156)

125 F; 25 to 225F; and 100 to 300 F. Each switch can be set in the field to actuate at any temperature within the service range. A differential setting arrangement is also available.

Applications for this thermostat include control of heating and cooling equipment in a constant temperature process; step control of a process to actuate various dampers, valves, recirculating lines, etc. in response to two critical temperatures; control plus high-limit cut-off alarms. Switches are available to handle to 20 amp at 125 or 250 v a-c; 10 amp at 125 v d-c. Fenwal Inc.

27—STEEL FRAME affords simplified construction jobs

Concrete, steel, wood and aluminum can all be used with this steel building frame, if desired, says manufacturer, and neither construction skill nor scaffolding is required to erect the building. Each

frame is a steel tapering depth, lattice framework. Over 10,000 lb can be supported by one of these main frames with its 40-ft span, it is stated. Frames are bolted to the foundation 12 ft apart. "J" nailing clips on the frame receive the wood girders and roof purlins. It is pointed out that many combinations of material now available may be used to enclose the building. Wood girders and purlins are also reported to simplify interior construction; doors and windows can be arranged as desired. Pruden Product Co.

28—PLASTIC INSULATION features easier workability

Franco-Therm is a plastic insulation for application where easier workability and tighter adherence is required than that afforded by most plastic insulations. Tests are reported to show that it develops no shrinkage and is waterproof, and that it will absorb hot or cold water and no destruction will take place. According to manufacturer, the material also resists destruction by boiling water and can be re-used. Intended for use to 1800 F, Franco-Therm dries white, and is described as having low thermal conductivity and being resistant to abrasion, vibration, impact and rust. It is sug-

MICRO precision switches

...THEIR USE IS A PRINCIPLE OF GOOD DESIGN

HONEYWELL

CUT COSTS!

Make your plant more automatic and more productive

Send for Catalog #83 for information on MICRO SWITCH "Industrial Enclosed Switches"

• For years plant operating men have been putting new life into old machines—at low cost—by installing MICRO SWITCH precision switches to make them more automatic and more productive.

They do so by using MICRO SWITCH switches as limits, interlocks and safeties on almost every conceivable type of plant equipment. Special switches are available for use in explosive atmospheres or other hazardous locations. A wide variety of circuit arrangements, actuators and enclosures meets specific operating requirements.

Plant superintendents, electricians and maintenance men have found MICRO SWITCH products invaluable in making present equipment more productive. Full stocks of switches are readily available from authorized distributors who are as close as your telephone. Look under "Switches, Electric" in the Yellow Pages.

ANY OF THESE CATALOGS WILL BE SENT ON REQUEST

- 62a • "Basic Switches"
- 73b • "Toggle Switches"
- 74b • "V3 Switches"
- 75a • "Subminiature Switches"
- 82 • "Basic and Enclosed Switches"
- 83a • "Industrial Enclosed Switches"
- 90a • "Mercury Switches"
- 101b • "Switches for Industry"

MICRO SWITCH

A DIVISION OF MINNEAPOLIS-HONEYWELL REGULATOR COMPANY

In Canada, Leaside, Toronto 17, Ontario • FREEPORT, ILLINOIS

HONEYWELL

HOW SWITCHES HAVE BEEN USED TO SAVE TIME AND MATERIALS

Stops needle breakage:
Switch stops knitting machine when slack develops in wire. Mechanism starts automatically when slack is relieved.

Protects personnel:
Explosion-proof switch installed on filter system permits operation of equipment only if vent valve is closed.

Prevents conveyor pile-up:
Two switches wired in series, each operating independently as sugar bag passes. When bags pile up, both switches are operated and conveyor stops.

Counts revolutions of mixer:
Switch connected with counting device is actuated by each complete revolution of mixing drum, recording number of revolutions at convenient point for operator.

For more facts circle 603 on Reply Card

"This true story is typical of the expert know-how you may expect from the Skellyfuel people . . ."

"The shrill ring of the bedside phone awakened me at 11:03 p.m. It was long distance, from a midwest utility company. A crisis! Their LP-Gas system was operating erratically and threatening to shut off the town gas supply. Although Skellyfuel hadn't installed their equipment, they had heard of our trouble-shooting 'know-how.' They needed help at once.

"In just two hours I got off the plane, and hurried to the gas plant, and gave the equipment a thorough check.

"Within an hour, the trouble was found to be caused by improperly installed controls. With the assistance of the plant superintendent, the necessary changes were made. With the trouble corrected, the plant quickly resumed proper operation."

Even though you may never have had an LP-Gas problem like this, it's good to know that you can call on the expert LP-Gas Skellyfuel specialists. With Skellyfuel, LP-Gas and gas systems are not just a sideline. We've specialized in it—pioneered it, in fact—for over 25 years.

No other company gives you a more complete service than Skelly Oil Company. Our integrated services include: (1) analyzing your needs; (2) designing and constructing your fuel system; and (3) *supplying the highest quality LP-Gas available.*

For a more complete story of Skellyfuel and how Skellyfuel's integrated services may assist you, phone us today or write for our 20-page color booklet.

SKELLY

Skellyfuel

SKELLY OIL COMPANY

Industrial Division

605 West 47th Street • Kansas City 41, Missouri

For more facts circle 604 on Reply Card

NEW PRODUCTS

(Begins on page 156)

gested for use around air ducts, boiler settings, boiler drums, breechings, burner casings, economizers, heat exchangers, hot air lines and similar applications. J. H. France Refractories Co.

29—UPLIGHT REFLECTOR for high bay mercury lighting

This aluminum uplight reflector is offered to meet the need for greater uplight from the new color corrected mercury vapor lamps used in high bay lighting. The reflector measures 24 in. in diameter and utilizes an open top design said to result in 16 to 18 per cent uplight when used with the H1000-C15 and H400-RC1 mercury vapor lamps. This feature serves to maintain proper balance of light between lamp and ceiling, reducing contrast. Manufacturer also claims that this fixture improves shielding of the lamp. It is available in socket-reflector or separable-socket (disconnecting) mounting types. Abolite Lighting Div., Jones Metal Products Co.

It's easy to obtain product data with the postage-free Reader Service Cards provided on pages 241-242. Use them for information on advertised products, too. Just circle the key number appearing at bottom of the ad.

30—WIRE ROPE CLIPS for heavy duty service

ACCO Wire Rope Clips are drop-forged from high grade forging steel and provide positive "grips of steel" for heavy duty service, says manufacturer. In these clips, the base channel is shaped to hold the wire rope securely without damage to individual strands. They can be applied on the job without vise or special tools. The heavy steel U-bolts are protected against rust and corrosion by hot-dip galvanizing after threading, and further protection is a green chromate coating applied after galvanizing.

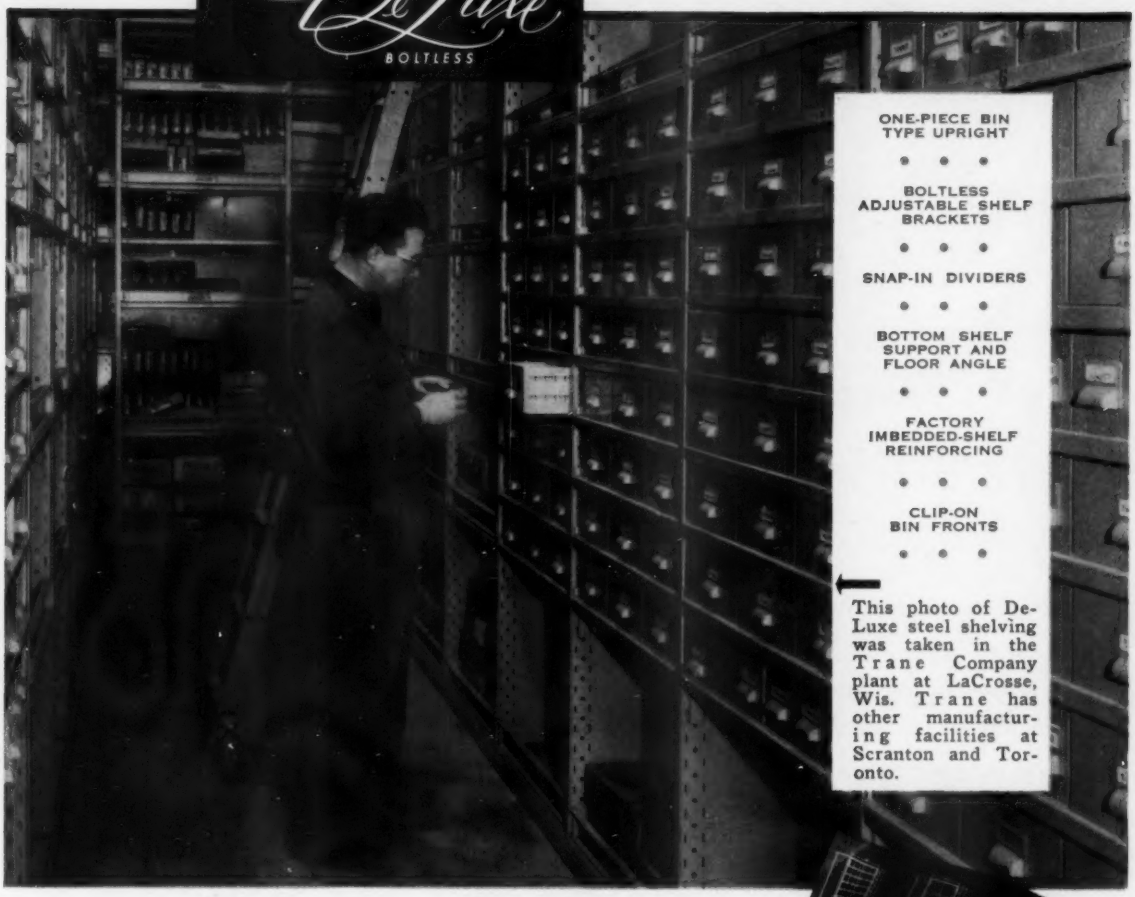
The clips are made to secure wire ropes of ⅜- to 1¼-in. diam. They are pre-packaged in lots of 100, 50, 25 and 10, depending on size. Wire Rope Div., American Chain & Cable Co., Inc.

31—IMPROVED TAPE can stand chemicals and heat

Scotch Brand 549 is an improved pressure-sensitive Teflon tape reported to defy action of many reactive chemicals and drastic temperature changes. The semi-transparent, blue-gray tape is designed for quick and easy application to a variety of surfaces. It comes in both a 3½- and 6½-mil thickness, consists of

THE TRANE COMPANY SOLVES A COMPLEX FACTORY PARTS STORAGE PROBLEM

WITH THE ORIGINAL DeLuxe BOLTLESS STEEL SHELVING



ONE-PIECE BIN TYPE UPRIGHT

• • •

BOLTLESS ADJUSTABLE SHELF BRACKETS

• • •

SNAP-IN DIVIDERS

• • •

BOTTOM SHELF SUPPORT AND FLOOR ANGLE

• • •

FACTORY IMBEDDED-SHELF REINFORCING

• • •

CLIP-ON BIN FRONTS

• • •

This photo of DeLuxe steel shelving was taken in the Trane Company plant at LaCrosse, Wis. Trane has other manufacturing facilities at Scranton and Toronto.

Trane wanted steel shelving with the most adaptability, top quality, and ease of installation. DeLuxe fulfilled these requirements. The section shown is located in the Trane coil plant where parts for every line of products manufactured by Trane are stored. Other shelving installations are strategically located. Continuing cooperation in layout and design between Trane and DeLuxe resulted in an installation individualized to this Company's storage requirements.

May we recommend you ask about the DeLuxe design engineering service—or contact your nearest DeLuxe representative in the Yellow Pages. You can also obtain very helpful information on shelving specifications by writing for our new 54-page Catalog #29-A.

FOR MAXIMUM SAFETY . . BUY DELUXE

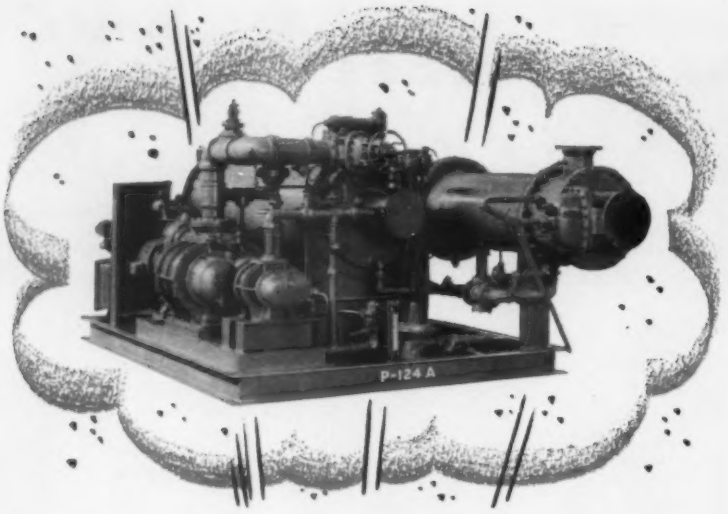
DeLuxe

DELUXE METAL FURNITURE COMPANY

402 STRUTHERS STREET, WARREN, PENNSYLVANIA

A DIVISION OF THE ROYAL METAL MANUFACTURING CO. / MANUFACTURERS OF "VERTI-FILE", "TEMPLA-FILE", AND QUALITY FACTORY FURNITURE.

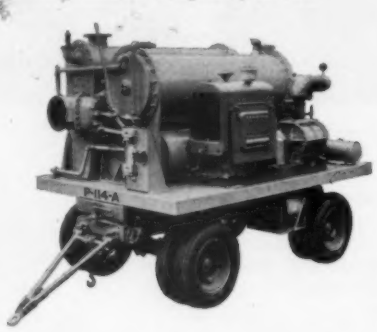
For more facts circle 605 on Reply Card



When PROTECTION is needed... call on R-C Inert Gas Generators

At a moment's notice of fire or explosion dangers, smothering gas flows instantly from Roots-Connersville Inert Gas Generators. From either stationary or mobile units, oxygen-free gas is constantly available for purging or other operations, to protect lives, property and production. Initial cost is low, no full-time operator is needed, and reduction of insurance premiums frequently offsets the original investment.

For details on how R-C Inert Gas Generators afford constant, instant protection, just call your nearest Roots-Connersville office or mail the coupon.



ROOTS-CONNERSVILLE BLOWER

A DIVISION OF DRESSER INDUSTRIES, INC.

956 Power Ave., Connersville, Indiana. In Canada—629 Adelaide St. W, Toronto, Ontario

Please send us Bulletin IGG-155 on fire and explosion protection with R-C Inert Gas Generators.

Name _____ Title _____

Company _____

Street and City _____

For more facts circle 606 on Reply Card

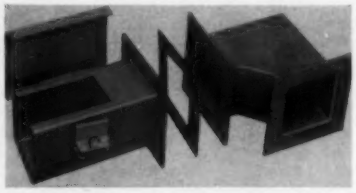
NEW PRODUCTS

(Begins on page 156)

2- and 5-mil films coated with 1½ mils of silicone adhesive. The thinner of these is claimed to have 200 per cent elongation and tensile strength of 25 lb per inch of tape width; the 6½-mil tape, 150 per cent stretch and 40 lb tensile strength. Both tapes, company states, are unaffected by temperature change within the range of —65 to 400 F continuously, 457 F intermittently, and offer conformability at all times. Minnesota Mining and Mfg. Co.

32—SECTIONAL RACEWAY, full line of fittings

Oiltight raceway in sizes 2½-by-2½ in. and 4-by-4 in., in lengths to 10 ft. is announced along with a complete line of fittings—elbows, tees, crosses and closure plates—to permit bolting the raceway



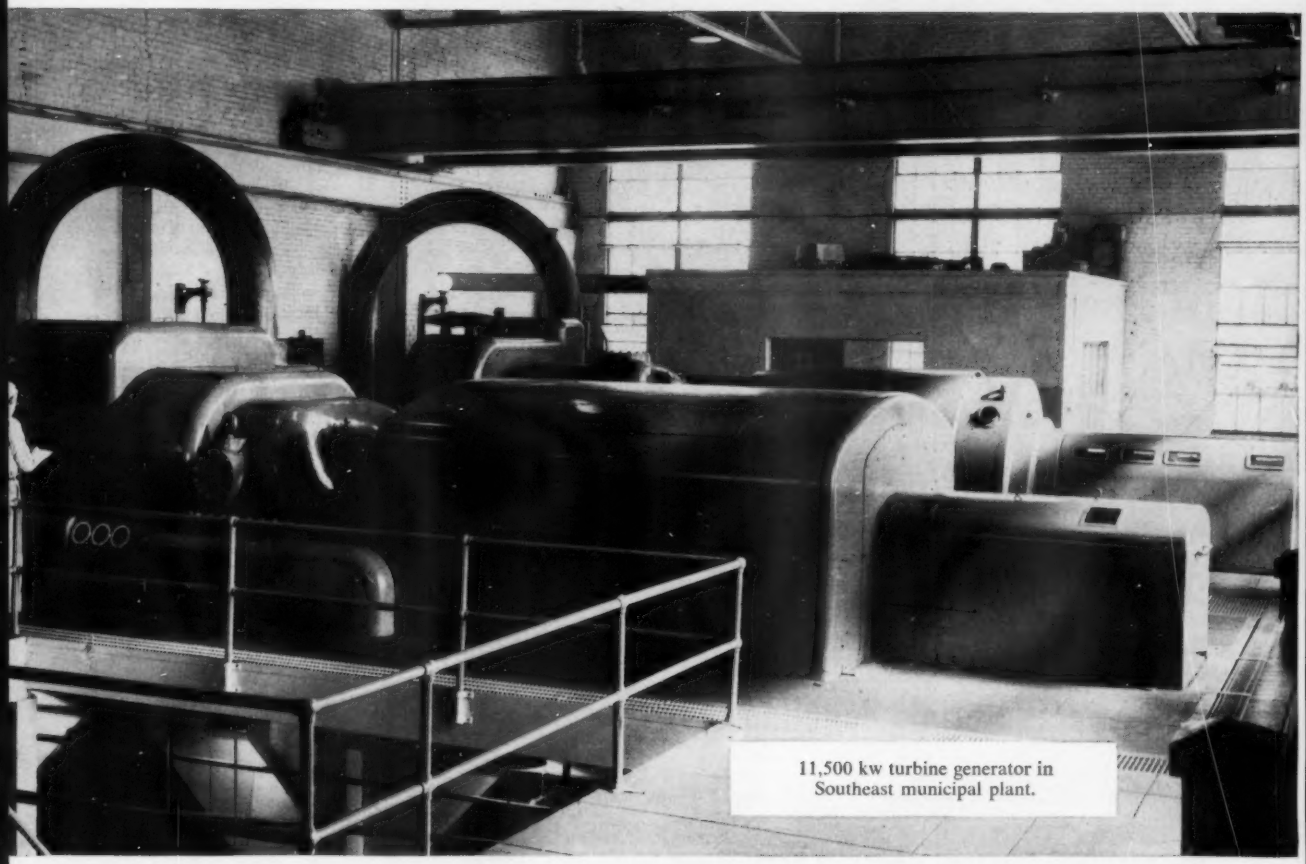
together to fit almost any machinery or building requirement. The trough has a hinged cover to permit access to the interior of the full length of each section. Fourteen-gage sheet steel is used throughout except on the welded connection flanges which are 11-gage steel. Finish is gray hammertone enamel over a phosphatized surface. The cover is gasketed with sponge Neoprene rubber and a Neoprene gasket is placed between each section to make the assembled raceway oil, dust and water tight. Hoffman Engineering Corp.

33—POLISHING CLOTH shines all surfaces

Called Most, this polishing cloth is made of soft flannel impregnated with silicones. According to company, it contains no oils, waxes or other polishes, but does contain a rust inhibitor and it acts as an anti-static agent. Tests are reported to show it suitable for polishing wood, metal, plastic, tile, glass or leather. It is available in three or 12 cloth packs, six dozen cloths to a master carton, each cloth in a reusable polyethylene bag. Walton-March.

34—SOLID FILM LUBRICANT comes in aerosol bomb

When sprayed on troublesome parts, (both metallic and non-metallic) Lubri-Bond A is said to increase the wear-life by decreasing the coefficient of friction of these parts. The resin-based, air-dry lubricant is reported to operate in a temperature range from —300 to 500 F,



11,500 kw turbine generator in Southeast municipal plant.

Specializing in turbine generators up to 15,000 kw gives you better product service

Take priority, for example. Because Worthington is not involved with building the huge central station turbine generators, they give A-1 priority to the design and manufacture of industrial and municipal units.

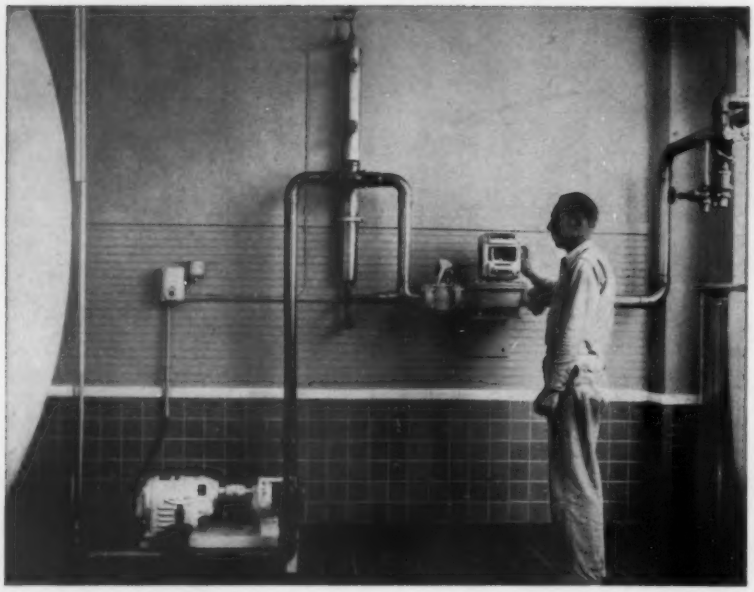
Every Worthington turbine generator receives the personal attention of top engineering and manufacturing personnel. Skilled craftsmen, with years of experience in the manufacture of turbine generators, take pride in their job of building reliability into every part. They take the time and trouble to take care of the little things that mean so much to dependable operation. Their attention to detail is reflected in such things as the dials which are recessed and mounted at an angle for easy reading. And before it is allowed to leave the factory, every unit is completely assembled and meticulously tested.

When considering a turbine generator installation up to 15,000 kw, call on the *specialists* in the field. Get in touch with your nearest Worthington District Office or write for Bulletin 1960C. Address Section T63, Worthington Corporation, Harrison, N. J.

T.6.3

WORTHINGTON

For more facts circle 607 on Reply Card



Simple Metering System Boosts Trend to Liquids For Lower Materials Handling Costs

Many ingredients can be handled more economically, with closer formula control, by converting from bulk solids to liquids.

Liquid sugar, for example. It's delivered by tank truck to a simple storage and pumping system in your plant. Put a Neptune Auto-Stop meter at each mixer or kettle and you literally have "push-button control." You just push buttons on the meter to set the quantity, open the valve, and the Auto-Stop shuts off *automatically* . . . "on the nose."

You make these savings: (1) Fewer rejected batches; (2) no heavy bags to lug, no scale weighing; (3) no sifting or spills, hence fewer rodent problems; (4) save valuable storage space by placing tanks in cellars or on roofs; (5) cut hidden losses, get easier inventory figures.

Neptune meters now handle more than 150 different liquids. Capacities from 2 to 1000 gpm., bronze construction. Registers range from simple counters to electrical switch controls for pumps, valves, agitators. Write or phone for details.

NEPTUNE METER COMPANY
19 West 50th Street • New York 20, N. Y.

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Ask for Bulletin 566-TPE

For more facts circle 608 on Reply Card

NEW PRODUCTS

(Begins on page 156)

and to be an excellent choice for parts operating at high speed and high load. Lubri-Bond A dries in 30 min and can be used in conjunction with oils and greases where oil is necessary as a cooling agent, according to manufacturer, or it can be used without them. It is suggested for gears, actuators, cams, hinges, pins, shafts, tracks, threaded parts, frictional bearings, and other moving surfaces where friction is a problem. It comes in 12-oz spray bomb containers. Electrofilm, Inc.

35—WELDING PROCESS with semi-automatic hand gun

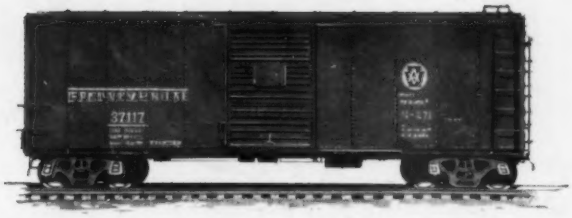
The C-Omanual is announced as the first semi-automatic hand gun welding process designed specifically for use with carbon dioxide. It uses inexpensive CO_2 gas to shield the arc. Compact and portable, process contains a hand gun, control unit and 600-amp power source. It was

designed to fill the need for a welder offering welding speed advantages of fully-automatic operation without high jig fixture tooling costs. Process is intended for use on mild or carbon steel welding applications, wherever a high degree of automatism is desirable.

Automatic control of current is reported to compensate for operators' variations of arc length, eliminating back burning and stubbing. Process is announced as affording deep penetration and high metal deposits with sound quality, strength and ductility. Visible arc speeds spotting of nozzle, for faster welding. No flux is needed. Wire speeds range up to 600 in. per min. Control console contains two-speed automatic head which allows operator to get proper feeds for light or heavy wire with selector switch. It also contains wire reel, feed and speed controls, electrical circuits, gas, water connections. Welding Products Div. A. O. Smith Corp.

36—VACUUM CLEANER is heavy duty, mobile unit

For both wet and dry pickup, the Clements-Cadillac Model 14 has a two-speed motor for high- and low-speed operation. Another feature announced is a simplified, money-saving method of coupling which lets the hose be connected to the power unit outlet (for blowing) and



IT'S EXPENSIVE TO KEEP THESE SITTING AROUND...

Keep 'em moving !

Here's the answer to many freight problems! It's the Heavy-Duty Trackmobile . . . a revolutionary new machine that helps solve the freight car shortage by keeping freight cars on the move. It assures a steady flow of products and materials in and out of the plant. It will reduce demurrage costs . . . it will save time and money in many ways.

Because of its unique versatility, the Trackmobile is always ready to pull, switch and spot cars at a moment's notice. It quickly transfers from road to track and from track to road. Ruggedly and powerfully built, it easily handles several cars or more on level track or grades . . . winter or summer, rain or shine. It will increase your manpower efficiency and eliminate switching jams. Many leading firms throughout the country are now using one or more Trackmobiles. Send for complete information now!

Whiting Corporation, 15675 Lathrop Ave., Harvey, Illinois. Manufacturers of Cranes • Trambeam • Railroad, Foundry and Chemical Processing Equipment.

WHITING
TRACKMOBILE

The Trackmobile easily and quickly moves from road to track and vice versa. Write today for the new 16 page Trackmobile Bulletin T-115 . . . completely illustrated with in-use photographs.

For more facts circle 609 on Reply Card

penco—*There's Economy in The* ***RIGHT*** *Equipment*

WHEN

DOLLARS

ARE

MEASURED

BY

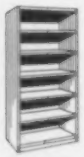
INCHES

Whether your storage problem concerns office, plant, school, club, institution . . .

When your available space for shelving, cabinets or lockers means that you must have equipment *that makes every inch give full value . . .*

That's when your Penco dealer can give you planning assistance . . . and the versatile, adaptable, *extra-space* high-quality Penco steel equipment that means *more usable storage space* per dollar spent.

Write for Catalog PE

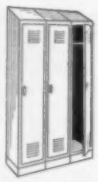


penco
Steel Shelving

made from more than 700 component standard parts—permits versatility in assembly design . . . gives you the proportionate space you need for each type of storage.

penco
Steel Cabinets

the Quality Line—extra-big . . . and all with adjustable shelves . . . meet every storage and wardrobe problem. Girder-type construction; no sag or bend.



penco
"Perma-Built"
Steel Lockers

come in standard sizes and designs which make available more than 300 combinations of standard types . . . including the one that fits your space and staff problem.

Planning for Your Service—Swift Service for Your Plans

Penco specialists in storage equipment engineering are available—at no cost to you—to assist in planning an efficient, practical shelving installation to meet your needs.

As a division of Alan Wood Steel Co., steelmasters for 130 years—Penco is assured the full supply of high-quality steel which enables it to make prompt delivery on all orders.

DEALERSHIPS OPEN—Write for Details

penco
STEEL LOCKERS
CABINETS · SHELVING

penco METAL PRODUCTS DIVISION
ALAN WOOD STEEL COMPANY
Oregon Ave. & Swanson St. • Philadelphia 48, Penna.

For more facts circle 610 on Reply Card

NEW PRODUCTS

(Begins on page 156)

to the power unit inlet, or dirt container inlet (for vacuuming) by using only one swivel connector. The cleaner is instantly convertible for blowing operations, company states, and its power unit is easily dismounted for use as a portable blower-suction cleaner. Attachments designed to handle suction cleaning, blowing, and spraying jobs are available. Clements Mfg. Co.

37—HOLDER-DRIVER puts screws in tight spots

This screw-holding driver is designed to prevent dropping screws and save time in applications where screws must be inserted and started in hard-to-get-at

places. The tool's design incorporates twin bits that expand to grip the screw as the bit is placed, in a closed position, in the screw slot and slight pressure applied to the driver. When the screw has been started the driver is removed by tapping a release rod. The tool comes in a variety of lengths, including 10, 8, and 6 and 3 in.; in blade widths and thicknesses to handle No. 0 to No. ¼ slotted screws. H. J. J. Co.

38—ALUMINUM COATING protects and beautifies

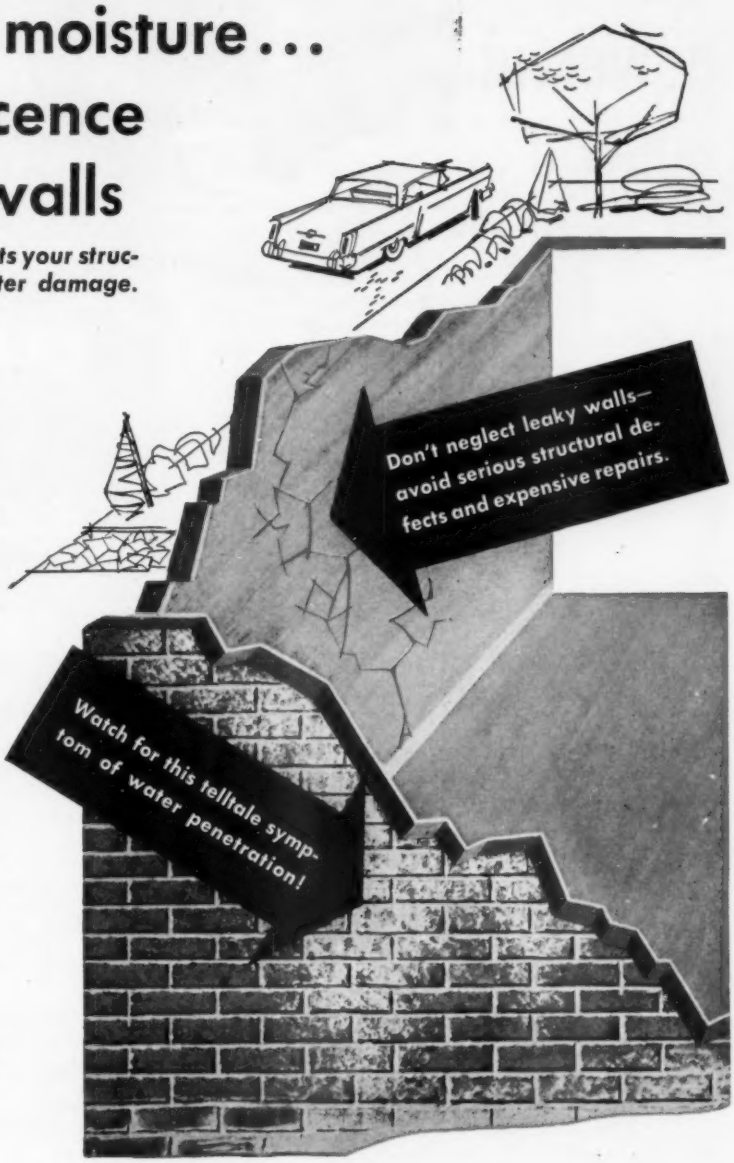
Ore-Ite is said to perform the three-fold task of waterproofing, protecting and decorating. It is noted that when Ore-Ite is used as a roof coating it virtually eliminates need for hot tar application and can reduce interior temperatures 10 to 15 deg. Ore-Ite can be used on any surface. It was developed by Duncan-Stewart Industries in conjunction with Aluminum Co of America, and the pigment used is in the form of highly polished aluminum flakes, instead of granules. Manufacturer explains that when Ore-Ite is applied, these flakes rise to the surface arranging themselves in parallel layers of 5 to 10 deep with a layer of Ore-Ite vehicle between each layer of aluminum. This forms an almost continuous overlapping metal barrier that is chemically resistant, according to company, and will not oxidize, corrode or be discolored by fumes. It provides high heat reflectivity and resistance to moisture and wear.

Ore-Ite is suggested for use on water towers, petroleum storage tanks and pipelines, for concrete or cinder block wall and for downspouts, gutters and

DEHYDRATINE NO. 22

seals out moisture... stops efflorescence on masonry walls

Silicone base water repellent protects your structures from inside and outside water damage.


Don't neglect leaky walls—avoid serious structural defects and expensive repairs.
Watch for this telltale symptom of water penetration!

Dehydratine No. 22 is no ordinary "surface" repellent. It functions on the principle of "negative capillarity" *in depth.* The highly penetrating characteristics of Dehydratine No. 22 set up a valve-like action within the masonry that permits vapor to escape *outward,* but stops the capillary absorption of solid drops of moisture from passing inward.

Dehydratine No. 22 reduces soiling and discoloration

Dirt and soluble stains cannot enter the pores of masonry treated with Dehydratine No. 22. Thus foreign particles trapped on the surface are readily washed off by rain. Owners and operators of concrete or light-colored stone buildings find that this saves money by eliminating difficult and expensive cleaning operations. Since Dehydratine No. 22 is effective against "white bloom" or efflorescence, it preserves the original beauty of the exterior without changing the color or texture of the surface. It pays to protect your structures against *inside* and *outside* water damage with Dehydratine No. 22.

A Subsidiary of Sun *Chemical Corporation*

HORN

A. C. Horn Co., Inc.

Long Island City, Los Angeles, San Francisco, Atlanta, Houston, Chicago, Toronto

FREE INFORMATION

A. C. Horn Co., Inc.
Dept. H2-95, 10th St. & 44th Ave., L. I. C. 1, N. Y.

Please send me more information on Dehydratine No. 22.

Name_____

Company_____

Address_____

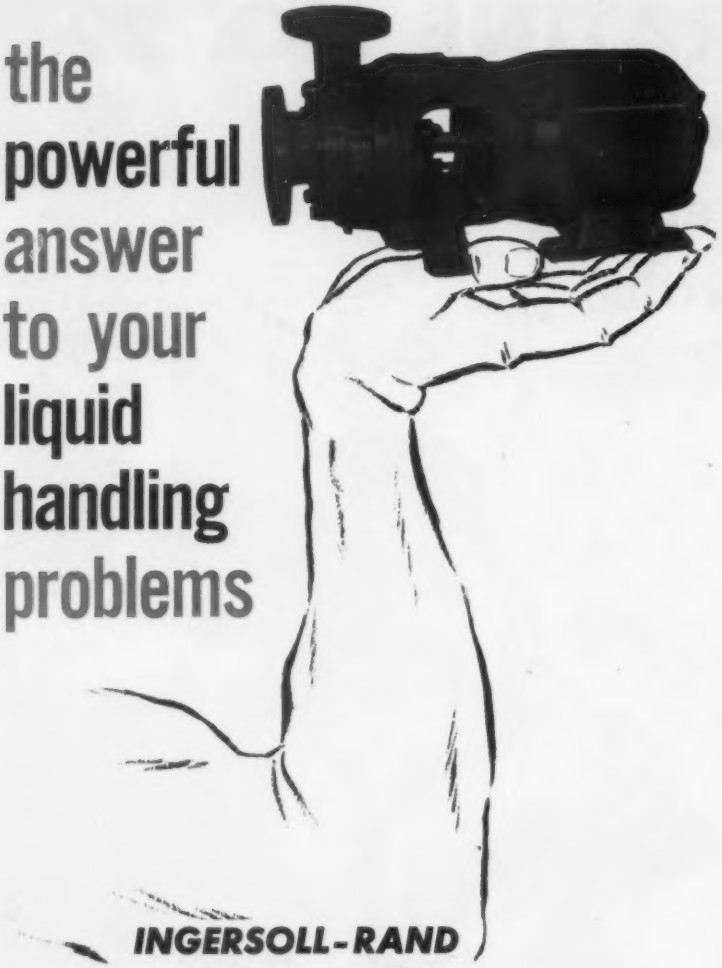
City_____ State_____

DIVISIONS OF SUN CHEMICAL CORPORATION

HORN • **HUDSON** • **WILLEY** (paints, maintenance and construction materials, industrial coatings) • **WARWICK** (textile and industrial chemicals) • **WARWICK WAX** (refiners of specialty waxes) • **RUTHERFORD** (lithographic equipment) • **SUN SUPPLY** (lithographic supplies) • **GENERAL PRINTING INK** (Sigmund Ullman • Fuchs & Lang • Eagle • American • Kelly • Chemical Color & Supply Inks) • **MORRILL** (news inks) • and **ELECTRO-TECHNICAL PRODUCTS** (coatings and plastics)

For more facts circle 611 on Reply Card

the powerful answer to your liquid handling problems



INGERSOLL-RAND

MOTORPUMP

When production lags because of inadequate pumping facilities, you need the dependable power of an Ingersoll-Rand Motorpump. These pumps are designed for deliveries of from 5 to 2800 gallons per minute, they operate in any position and being compact, save floor space as well!

I-R Motorpumps are efficiently designed for economical performance and ruggedly constructed to stay on the job with a minimum of maintenance.

To get all the details on I-R Motorpumps in sizes from ¼ to 75 hp, write for complete catalog data.

Ingersoll-Rand

9-421 11 Broadway, New York 4, N. Y.

For more facts circle 612 on Reply Card

NEW PRODUCTS

(Begins on page 156)

flashing. Indoors it may be used to protect metal tools and equipment, and to reduce heat loss on furnaces, ducts and pipelines. The coating comes in an asphalt base for use on roofs and foundations and in a multi-purpose, non-toxic varnish base. It is applied by brush, spray or roller and requires no priming coat. Available colors are gold, silver, copper, flamingo pink, coral, blue. It costs less than $9.00 per gallon for the asphalt-based type, less than $10.00 for varnish-based. Duncan-Stewart Industries, Inc.

More information on any of these products can be yours without cost or obligation. Just circle the item numbers on the Reader Service Cards provided on pages 241-242.

39—POLYESTER ELASTOMER has high tensile strength

Disogrin, a diisocyanate polyester elastomer, offers tensile strength, abrasion resistance characteristics and long life, as well as resistance to high ozone concentrations, to oil and jet fuels, and to radio-activity, it is announced. Its physical and chemical properties appear to surpass those of natural and other synthetic rubbers. Initially, Disogrin is likely to find its widest application for general use in the hydraulics and mechanical fields, wherever sealing and abrasion are problems. Greer Industries, Inc.

40—REDUCING VALVE for heat, process steam uses

This air loaded, diaphragm operated, pressure reducing valve, the Class GPK has a simple design. There are only two moving parts—a metal diaphragm with full valve travel and a hardened stainless steel main valve that seats on a renewable stellited seat ring. An air loader is used instead of a loading spring, and is designed to produce a constant loading force on the diaphragm. The design is said to assure the same control point over full travel. The valve comes in ½- to 2-in. sizes, with screwed end connections. Inlet pressure range is 0 to 250 psi, 450 F. Used with company's Class A air loader or Type P panel mounted loader, the reduced pressure range is 0 to 85 psi; or up to 249½ psi with a high pressure loader. More data is in Bulletin 561. Leslie Co.

41—COLORED TAPE for use with bag closers

Permacel 742 is colored self-sticking tape for use with automatic bag closure equipment for pre-packaging bags. It comes in dark red, dark green, white, light green, blue and yellow. The tape is a

For more facts circle 613 on Reply Card →

for

SMO-O-O-O-TH

starting

without

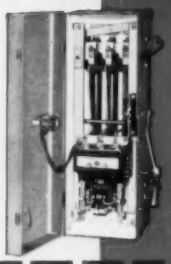
line disturbances

ALLEN-BRADLEY *Quality* Reduced Voltage Motor Starters

MANUAL STEPLESS RESISTANCE TYPE

Graphite compression disc resistors provide smooth, stepless starting of polyphase squirrel cage motors—prevent lamp flicker. Operated by a hand lever, the smooth starting of the motor is under the control of the operator.

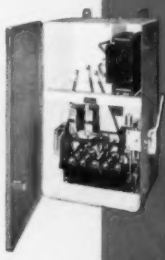
BULLETIN 640



MANUAL AUTOTRANSFORMER TYPE

Recommended where the characteristics of the driven load or power company rules require reduced voltage starting. Double break, silver alloy contacts are standard for air-break starters . . . copper contacts for oil-immersed units.

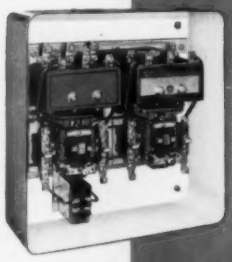
BULLETIN 646

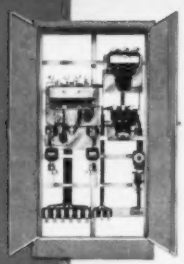


AUTOMATIC PART-WINDING TYPE

For use with squirrel cage motors having two separate parallel stator windings. Two types—Style A, two step starter; Style B, three step starter having resistance in series with motor on the first step.

BULLETIN 736





AUTOMATIC MULTIPOINT RESISTANCE TYPE

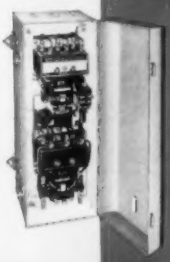
Meets power company starting current rules on network systems. Resistors are automatically inserted in the line at starting, and are short circuited in steps at definite time intervals which can be adjusted from 1 to 5 seconds.

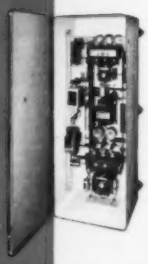
BULLETIN 741

AUTOMATIC GRAPHITE RESISTOR TYPE

Graphite disc resistors are automatically inserted in series with the squirrel cage motor at starting. These resistors can be steplessly adjusted for motor and load conditions, resulting in remarkably smooth acceleration of the motor.

BULLETIN 740

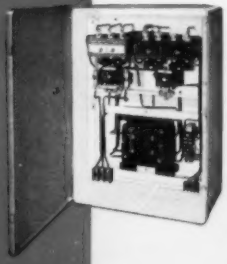




AUTOMATIC STEPLESS GRAPHITE RESISTOR TYPE

The ultimate in velvet smooth acceleration of squirrel cage motors. Lamp flicker on network systems used for both power and light is eliminated. The graphite disc resistors are compressed automatically . . . smoothly and steplessly.

BULLETIN 742



AUTOMATIC AUTOTRANSFORMER TYPE

Utilizes an autotransformer connected in open delta to reduce line voltage for starting squirrel cage motors. Taps are provided on the autotransformer to adjust the voltage applied to the motor.

BULLETIN 746

7-56-M

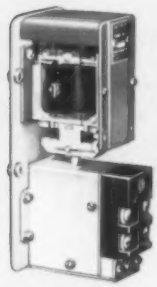
A-B Quality

ALLEN-BRADLEY QUALITY MOTOR CONTROL

Allen-Bradley Co., 1316 S. Second St., Milwaukee 4, Wis.

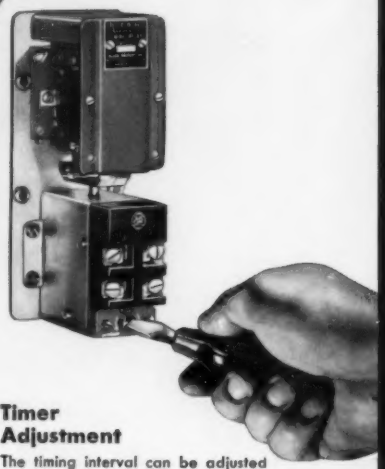
In Canada—Allen-Bradley Canada Ltd., Galt, Ont.

TIMING RELAYS!



Bulletin 849 "On-Delay" timer. By inverting solenoid, timer is converted to "Off-Delay" operation.

Installing instantaneously operated contact block with one N.O. and one N.C. contact



Timer Adjustment

The timing interval can be adjusted quickly and easily by turning the adjusting screw.

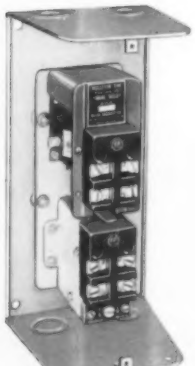
Tell Us About YOUR TIMER NEEDS . . . Allen-Bradley Has the RIGHT ANSWER!

Here is a line of pneumatic timers that can be adjusted for a consistent time delay of 1/6 second up to 3 minutes. Air, drawn into the timer through a needle valve, is freed from dirt and dust down to submicroscopic size by a high efficiency glass fiber paper filter. Thus the time settings are accurately maintained over long periods. These timers can be expected to operate reliably under conditions of severe atmospheric contamination.

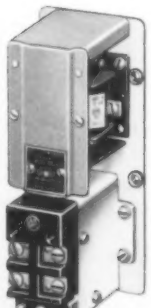
An outstanding feature of these timers is the wide variety of types available, and the modifications which can be made in the field, such as adding one or two instantaneously operated auxiliary contacts. Also, it is easy to change an "On-Delay" timer to the "Off-Delay" operation, or vice versa—by simply inverting the operating solenoid. The "On-Delay" timer provides the time delay *after* the magnetic operating COIL IS ENERGIZED; the "Off-Delay" timer provides the time delay *after* the operating COIL IS DE-ENERGIZED.

The Bulletin 849 timer has one normally open and one normally closed contact. As usual, the Allen-Bradley double break, silver alloy contacts are maintenance free. Auxiliary contacts can be mounted as shown below.

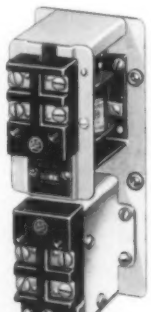
A few typical Bulletin 849 Pneumatic Timer combinations



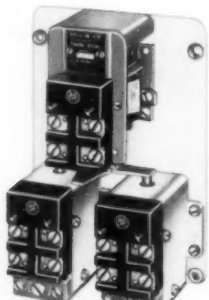
Bulletin 849 timer with one N.O. and one N.C. auxiliary contact.



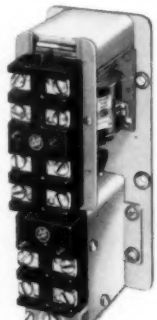
Bulletin 849 "Off-Delay" pneumatic timer with time delay *after* the coil is de-energized.



Bulletin 849 "Off-Delay" pneumatic timer with one N.O. and one N.C. auxiliary contact.



Bulletin 849 "On-Delay" pneumatic timer with two adjustable timing units.



Bulletin 849 pneumatic timer with two N.O. and two N.C. auxiliary contacts.

Allen-Bradley Co.
1316 S. Second St.
Milwaukee 4, Wis.

ALLEN-BRADLEY
QUALITY
PNEUMATIC TIMERS

In Canada—
Allen-Bradley Canada Ltd.
Galt, Ont.

7-56-MR

NEW PRODUCTS

(Begins on page 156)

combination of a pressure-sensitive, rubber based stain-resistant adhesive on a colored impregnated crepe paper backing. Designed for high speed produce packaging machines, the tape is reported to have unwind characteristics which produce free-running tape. Its high adhesion assures safe bag closures, says company, and the crepe backing assures conformance to irregular surfaces. Average adhesion of Permacel 742 is given as 15 oz in. of width; tensile strength, 23 lb per in. of width; and elongation 12 per cent. Permacel Tape Corp.

42—SCREWS, WASHERS cut down on faucet repairs

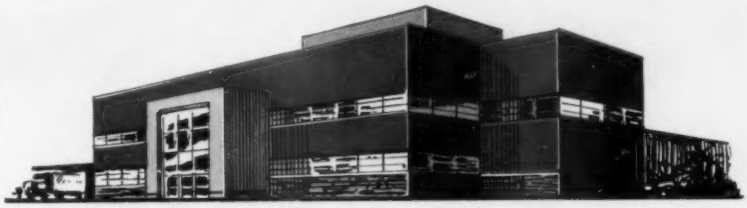
These screws and washers are designed to eliminate four out of five repeat repairs. Monel self-locking screws, with expanding nylon plug imbedded in the threads, automatically lock at correct depth and hold washer firmly. The self-

locking feature also cuts down number of needed sizes. Made of Monel free-machining nickel-copper alloy, these screws resist corrosion, says manufacturer; they won't dezincify, the heads won't twist off, and the screw slots won't distort. They are easily removed when necessary; can be re-used. When used with the Easy-Tite Faucet Washers, it is claimed this combination substantially reduces faucet repairs because washers are made of Neoprene, compounded to withstand super-hot water and stay tight even on worn, corroded seats. They are further reinforced with a vulcanized layer of Fiberglas to resist distortion and splitting resulting from shut-off squeeze. J. A. Sexauer Mfg. Co.

43—GLASSED STEEL TRAY in glass lined column

Processing advantages of corrosion resistant glassed steel are made available for use in tray type columns with construction features of the Turbogrid tray. Until now, use of glassed steel was restricted because of the problem of supporting a glass tray in an all glass tower, manufacturer explains. In this design, trays are supported inside a glass lined column by bolting glassed Inconel cups to column sidewalls. Teflon sheathed gaskets are used for sealing. Cups hold four heavy Pyrex tray support tubes, each encased in a Teflon or polyethylene shield. Small Pyrex tubes are laid across supporting members, held

Now add *Beauty*



to low-cost, maintenance-free roofs and sidewalls with Color Galbestos

Robertson's fifty years of pioneering in the protected metal industry, teamed with its extensive program of research at famed Mellon Institute of Industrial Research has perfected a protected metal with built-in beauty. Now you can have Galbestos in colors!

All of the time-tested advantages of a long, maintenance-free service life, resistance to fire, corrosion and extreme weather conditions that have made Robertson the world's standard of steel protection for over fifty years are now available in four new attractive colors . . . red, green, buff and gray in addition to the familiar black and maroon.

Roofs and sidewalls of Color Galbestos bring the much desired element of color to industrial and commercial buildings at a lower cost than any other means. These new colors, used singly or in combinations, open a whole new field of functional beauty to building owners and designers.

ROBERTSON Color Galbestos

H. H. Robertson Company

2419 Farmers Bank Building • Pittsburgh 22, Pennsylvania

In England—Robertson Thain Ltd., Ellesmere Port, Cheshire

In Canada—Robertson-Irwin Ltd., Hamilton, Ontario

Please send additional information on Color Galbestos.

NAME TITLE

COMPANY

ADDRESS CITY

For more facts circle 614 on Reply Card

YOU'LL SAVE TWO WAYS WITH AE STANDARD LO-HED

STANDARD LO-HED

(1)

PARES HOIST MAINTENANCE TO ROCK BOTTOM

(2)

CUTS MATERIALS HANDLING COSTS

NORTH, EAST, SOUTH AND WEST, plants are enjoying new economy and efficiency with AE Standard Lo-Hed. Many users have reported *no downtime* during two full years of rugged operation. This heavy-duty machine is built to serve industry years at a stretch—and to cut materials handling costs to new lows.

Available in 2- and 3-ton models and in a choice of trolley suspension types, Standard Lo-Heds have a lower limit safety switch and a 110-volt pilot circuit for voltages of 220 volts and up at no extra cost. All-steel welded construction combines light weight and rigidity.

Immediate delivery from stock in most models... Or, if you have *special* heavy duty requirements, AE's feature-packed Customized Lo-Hed could be the perfect answer. It's engineered in capacities from ¼-ton to 12 tons, and in five suspension types... Contact your local AE representative and see how either the Standard or the Customized Lo-Hed can solve your materials handling problems.

AMERICAN ENGINEERING COMPANY

DEPT. H-164, WHEATSHEAF LANE & SEPVIVA ST., PHILADELPHIA 37, PA.

Canadian Subsidiaries: Affiliated Engineering Corporations, Ltd., Montreal, P. Q.... Bawden Industries Ltd., Toronto, Ont.

AE products are: Taylor, Perfect Spread and Vibra-Grate Stokers, Hele-Shaw and Hydramite Fluid Power, Lo-Hed Hoists, Lo-Hed Car Pullers, Marine Deck Auxiliaries.

For more facts circle 615 on Reply Card

NEW PRODUCTS

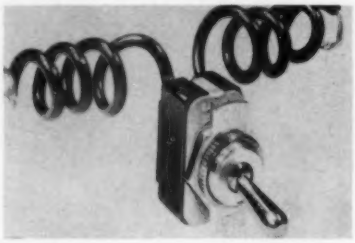
(Begins on page 156)

in position by Teflon or polyethylene spacers and by another heavy tube lying across them. Plastic plugs protect ends of tubes.

Typical installations include gas scrubbers and strippers, de-enthanizers, debutanizers, depropanizers and chlorinated hydrocarbon fractionations. Grid trays are said to have up to 100 per cent greater capacity than other types of equal size because of large surface for vapor-liquid contact, and lower pressure drop. The Turbogrid may be supplied for glassed or stainless steel columns and may be installed in new or existing equipment, with a diameter of 18 in. or larger. Tray design permits addition or removal when capacity changes are required. The Pfaudler Co.

44—SWITCHES, momentary contact, for 6-amp service

These two switches are available in two basic models, rated for 6 amp at 125 v or 3 amp at 250 v. Model 13 is a normally off, trigger-on style; and Model



14 a normally on, trigger-off style. They are recommended by manufacturer for trigger-type control of small drills and similar tools and appliances in their capacity range. Both switches feature a nickel finish and a molded phenolic case. They are available with screw terminals, lead wire, or soldering lugs. Stem is ¼ in. diam., ¼ in. long. Over-all dimensions are: ½ in. wide, ½ in. thick and 1 in. long. McGill Mfg. Co., Inc.

45—CENTRIFUGAL FANS feature improved blade

Series 6000 Silentvane Fans with Airfoil blading are designed to give 92 per cent peak mechanical efficiency and 88 per cent static efficiency in the movement of air in high pressure air conditioning, industrial process ventilation, other applications. According to company, Airfoil blading is not only responsible for these high efficiencies but this blade design lowers noise energy perceptibly as compared to other types. Each fan has low operating cost, it is noted, since maximum horsepower is attained within normal range of fan selection. Fans are designed for direct connection to conventional squirrel cage induction motors operated at standard motor speeds. For applications requiring regulation of air output over a wide range of operating

There's a *permanent* solution to your plant window problems

Here's a money-saving tip to the man whose job it is to look *at* windows instead of *through* them—when you see signs of recurring window maintenance expense, it's a good time to consider a permanent cure instead of spending money for temporary relief.

You know the tell-tale signs of window headaches all too well—broken window panes; loose putty; sash encrusted with rust, rot, and repeated painting. The discouraging thing is that the first repair job is never the last because what you have repaired is still exposed to the threats that caused the original trouble.

Happily, the problem has a "fix-it-and-forget-it" solution. PC Glass Blocks. The blocks are *mortared* into rugged, breakage-resistant panels. There's no putty to loosen. There's nothing to rust, rot, or paint. Washing once or twice a year is all that's necessary. It all adds up to a permanent solution to your plant window problems.

And maintenance saving is only part of the story. PC functional Glass Blocks control daylight and ban glare. Shading devices are seldom needed. The high insulation value of the air-and-dirt-tight panels reduces heating and cooling costs. And exterior appearances are improved.

For more information, see us in Sweet's, or write Pittsburgh Corning Corporation, Dept. PG-96, One Gateway Center, Pittsburgh 22, Pa. In Canada: 57 Bloor Street West, Toronto, Ontario.

Ventilator units, especially designed for glass block panels, are easily installed where vision and ventilation through the panels are necessary.

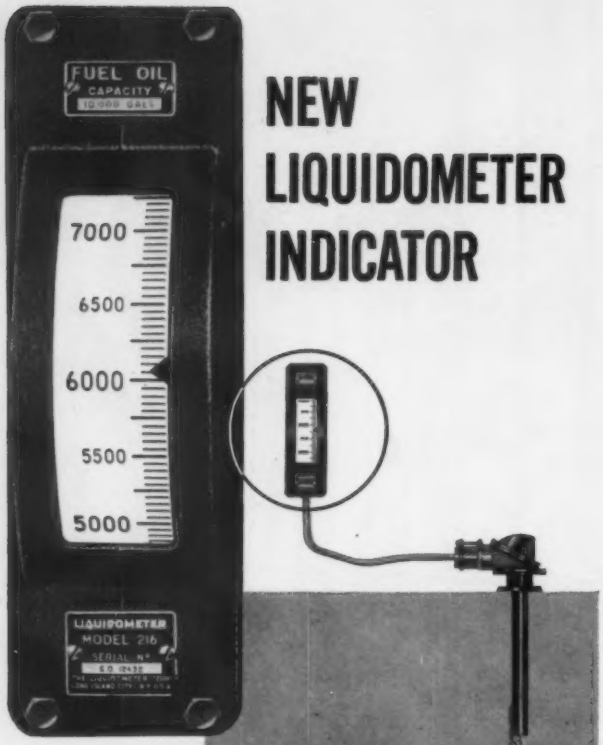
For better looks outside—better light inside—

PC Glass Blocks

PITTSBURGH PC CORNING®

Also manufacturers of FOAMGLAS® insulation

For more facts circle 616 on Reply Card



NEW LIQUIDOMETER INDICATOR

SAVES SPACE ON INDUSTRIAL CONTROL PANELS

Twenty-inch dial in 3x10¼" case permits close readings

The new Liquidometer Model 216 Indicator gives the plant engineer a reliable, automatic reading of storage tank contents. Available in either vertical or horizontal design, the compact and highly readable Model 216 Indicator makes possible multiple installations on crowded control panels.

Teamed with Liquidometer's time-tested hydraulic transmission gaging system, the new indicator provides instantaneous remote indication of liquid levels—automatically. No outside power source is required. Virtually any liquid may be measured, and the indicator can be located up to 250 feet from the tank.

Engineered for dependability, the Liquidometer gaging systems highlight these design features:

- Maintenance free
- Integral temperature compensation
- Ease of installation—requires only one 2" diameter tank opening
- Safety—all gages Underwriters approved for hazardous liquids

For further details on the new Model 216 Indicator, write Dept. D for Bulletin 532.

THE LIQUIDOMETER CORP.
SKILLMAN AVENUE AT 36th STREET
LONG ISLAND CITY 1, NEW YORK

For more facts circle 617 on Reply Card

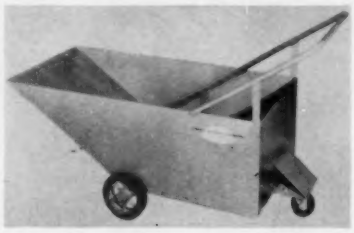
NEW PRODUCTS

(Begins on page 156)

conditions, inlet vane control is available operated either manually or automatically. Sixteen models are available, with wheel diameters from 27 to 108 in. Sturtevant Div., Westinghouse Electric Corp.

46—CART carries small parts, chips, liquids and waste

With an overall height of 20 in., the Model 47 Cart has easy clearance under work benches, hoppers, feeders or machine tools, and its bin type design makes



for easy loading and dumping. Other features of this low cost cart are a short turning radius, useful in narrow aisles, and low center of gravity for maneuverability. The cart body is mounted on two 8-in. roller bearing wheels and one 4-in., swivel caster. Solid steel or rubber tired wheels are available. Of 12-gage steel, the cart has a 7-ft capacity, and it weighs 95 lb. Coolant Equipment Corp.

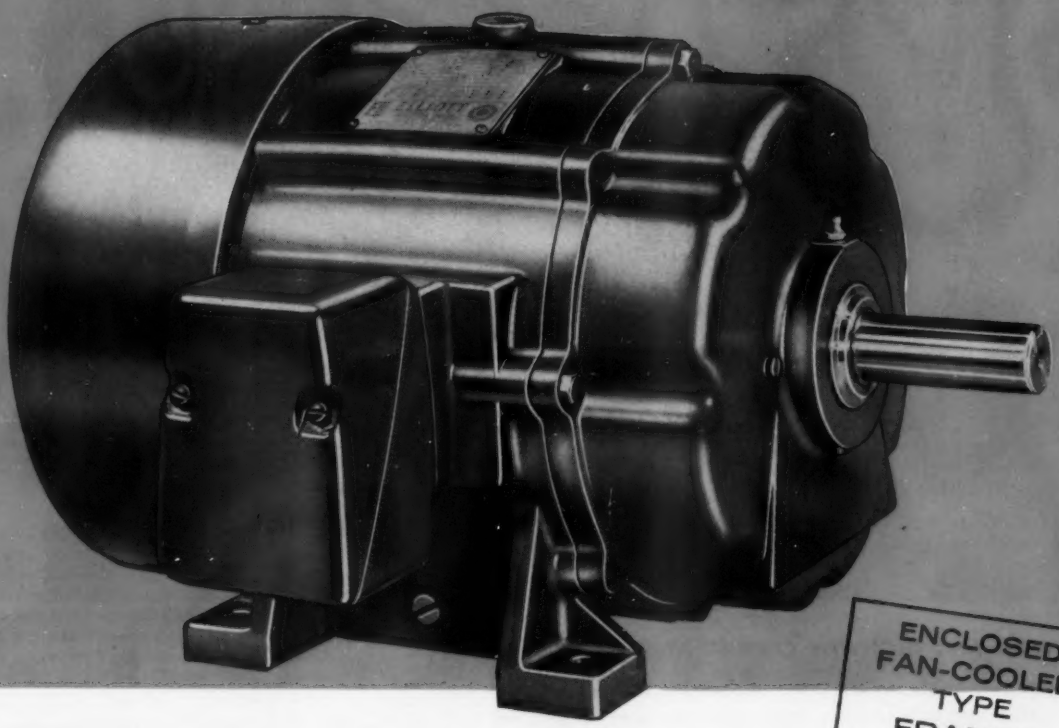
47—SOLENOID VALVE is new diaphragm type

Because of its diaphragm action and full flow ports, the K-181 Valve is reported capable of handling large capacities with minimum pressure drop, making it suitable for shutoff control of a variety of liquids and gases over a wide range of operating pressures to 250 psi. Great flexibility is attributed to company's multipoised design, which provides for operation in any position, including side and inverted mountings. The K-181 comes in ⅛- and ½-in. ips, in two basic models. Standard models handle a wide range of general applications using air, water, gases or light oils. Hot water models are declared particularly suited for controlling water at temperatures to 200 F. K-181 Valves are normally closed, have brass bodies, packless construction, two-wire continuous duty solenoids. Valves are also available with optional waterproof coil, explosion-proof housing and manual opening. General Controls Co.

48—AIR-DRIVEN PUMP for molten salts, metals

Designed especially for pumping molten salts and hot metals, this pump is powered by an air-driven motor which, it is announced, by its very nature is self-cooling. The pump body is made of a limited number of sturdy parts designed

Inside and Outside . . . entirely new



ENCLOSED FAN-COOLED TYPE FRAMES 184-256U

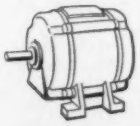
Elliott C-W Type N Motors

NEW PERFORMANCE! You get more horsepower per pound from these compact Elliott C-W motors because of their improved design, and the use of vastly superior insulating materials and electrical steels. Due to greater mechanical and dielectric strength, insulating materials occupy less space. More space is available for copper—the "muscle" of the motor.

NEW PROTECTION! Internal parts of Elliott C-W motors are completely protected by rugged housings—dripproof, or totally-enclosed, as required. Efficient fans assure ample cooling.

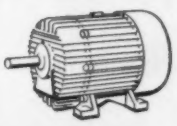
NEW DEPENDABILITY! New Elliott C-W type N motors are designed for the utmost in dependability. They will withstand physical abuse. Use of highly dependable insulating materials assures prolonged life; anti-friction bearings are available in several optional types, to meet severe service conditions.

OTHER C-W TYPE N MOTOR ENCLOSURES



Totally-enclosed non-ventilated

Dripproof Protected



Totally-enclosed, fan-cooled (ribbed frame)

ELLIOTT Company

CROCKER-WHEELER DIVISION

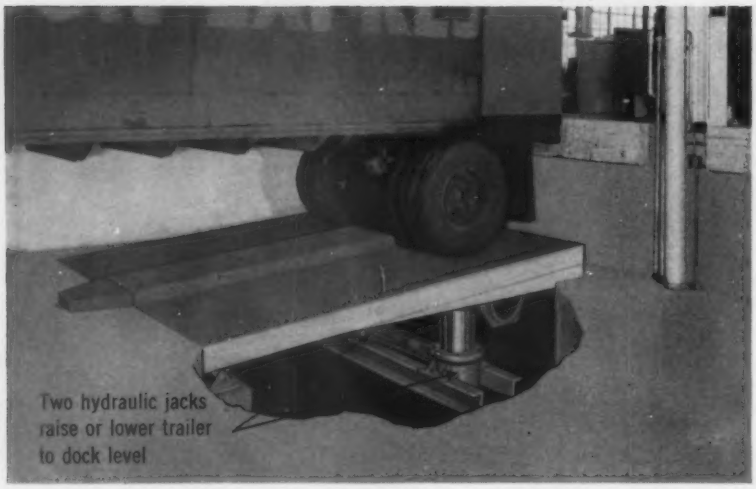
WRITE for new bulletin describing Elliott C-W Type N Motors. Address: Elliott Company, Crocker-Wheeler Division, Jeannette, Pa.

W6-4

For more facts circle 618 on Reply Card

NEW ROTARY TRUCK LEVELER

saves loading costs and dock space



Two hydraulic jacks raise or lower trailer to dock level

HANDLES ANY HIGHWAY CARRIER AT ANY LOADING DOCK

- Quickly levels any truck bed at dock height so pallet trucks and other materials handling equipment can move in and out with maximum speed and safety.
- Takes no space . . . installed in driveway in front of dock, leaving dock platform completely free of obstructions.
- 40,000-lb capacity, 24″ travel . . . handles any highway carrier at any loading dock.
- Raised center curb section guides wheels onto runways for fast, accurate truck positioning.
- Dependable, economical hydraulic operation by Rotary Oildraulic electric power unit.

For new or old buildings

The Rotary Truck Leveler is easily, inexpensively installed in any building. It is the ideal equipment for docks where construction or space limitations prevent use of ramps. Changes in materials handling systems or equipment will never make the Rotary Truck Leveler obsolete. Mail coupon below.

Rotary

Truck Leveler

Manufactured by
ROTARY LIFT CO., MEMPHIS 2, TENN.

Specialists in oil-hydraulic lifting devices.

Mail coupon for new catalog

Rotary Lift Co.
1154 Kentucky
Memphis 2, Tenn.

Send complete data on the Rotary Truck Leveler to:

Name_____

Address_____

_____

For more facts circle 619 on Reply Card

NEW PRODUCTS

(Begins on page 156)

for operation under high ambient temperatures. Available in steel or with stainless steel submerged parts (for temperatures over 1000 F), the pump has a maximum flow capacity of about 36,000 lb per hour using 90 psi air pressure. The volume can be reduced as desired by means of an air intake valve. Bulletin 800 gives details. Ajax Electric Co.

Use the Reader Service Cards provided on pages 241-242 to ask for more information on these products. Circle item numbers of products in which you are interested.

49—FOUR-POLE RELAY features compact size

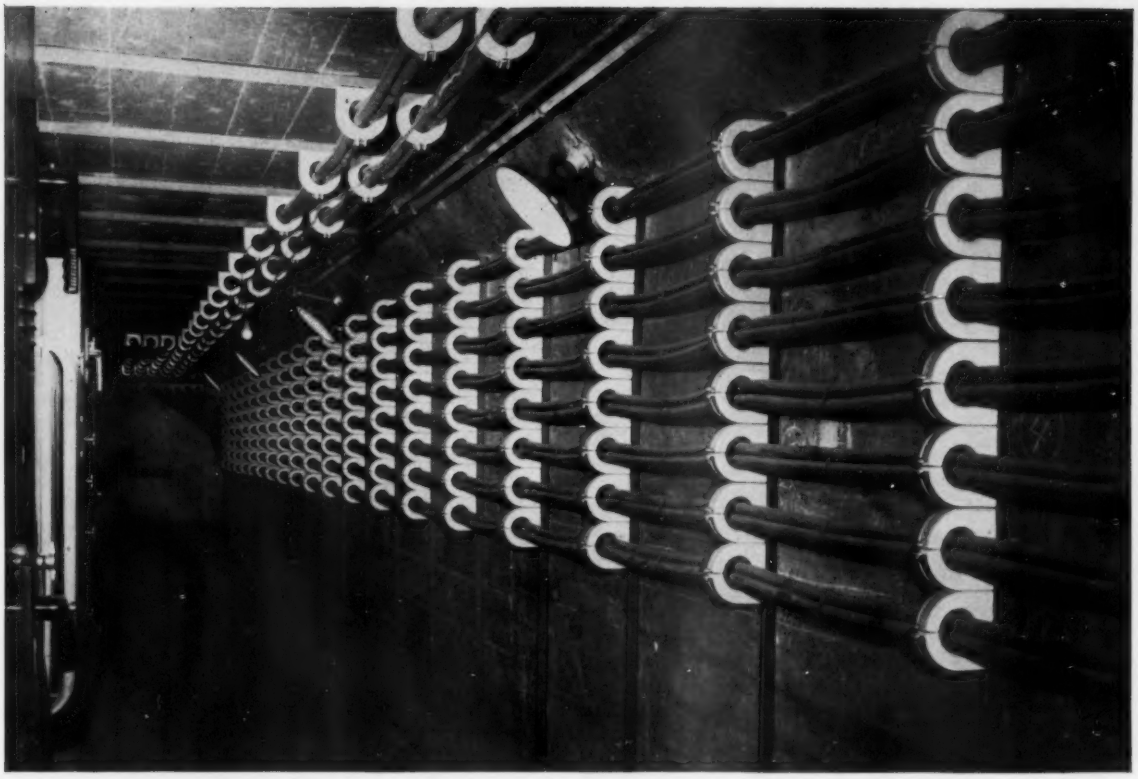
Identified as Class 8501, Type DO-42, this machine tool relay measures only 2⅛ in. wide by 3⅛ in. high, and is a companion device to company's two-pole Type DO-22 Relay. The two versions (both 10 amp, 600 v) will handle most relay applications. For mounting convenience and easy substitution when more poles are required, both relays have identical baseplates and can be mounted interchangeably. Square D Co.

50—MACHINE uses soft tool to work a harder one

This machine is designed to reproduce the shape and profile of a soft master electrode in an already hardened alloy or carbide piece. It strikes a series of sparks between tool tip and the harder block. According to manufacturer, it machines the "unmachinable" metal by direct action of electricity and the electrode does not come in contact with the piece it is machining. It is based on the eroding property of the spark. Company explains that, just as an automobile spark plug can eventually erode the electrode, this process, utilizing millions of sparks every minute under controlled high intensity current, enables this machine to remove 3 cu in. of material an hour on a surface as big as 50 sq in. or as small as a few thousandths, giving a 10 micro finish and holding tolerances of 0.0005.

The machine is composed of a high frequency generator and a machine with the general appearance of a jig borer. The generator is entirely electronic and incorporates rectifiers for changing the current into pulsating d-c, and capacitors for high energy storage. The machine has four working speeds; roughing, semi-finishing, finishing, and micro-finish—selected with the turn of a button. Another dial regulates the settings.

A major reason for the powerful performance claimed for this 4½-kw ma-



for maximum dependability . . .
world's most modern shell plant specifies
KEYSTONE 5KV CABLES

Nothing was spared to provide the surest and most adequate supply of electrical energy for the huge motors, pumps and other equipment that make the Scranton Ordnance Plant, operated by the United States Hoffman Machinery Corporation, the largest and most modern of its type in the world.

In production less than 18 months after the project was approved, the plant makes extensive use of Keystone insulated 5kv non-shielded cable.

A typical application of this top-quality, yet economical cable is found in the plant's forge shop. There, 1/conductor 750,000 cm Keystone insulated 5kv non-shielded cables feed power from 3-5000 kva transformers to 12-600 hp and 12 - 450 hp pumps which provide hydraulic pressure for the main drawing and forging operations. These dependable power feeder cables are installed in interconnecting underfloor tunnels like the one shown above.

You, too, can use Keystone cables to advantage in your operation. Ask for Bulletin H-463 for full details or write The Okonite Company, Passaic, N. J.

2954-A

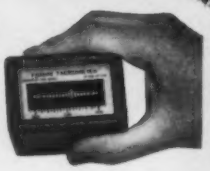
Available with either copper or aluminum conductors

where there's electrical power . . . there's **OKONITE CABLE**

For more facts circle 620 on Reply Card

Frahm® Resonant Reed Tachometer

Operates simply by being held against or mounted on the machine under test. Measures vibrations per minute as well as rpm from 900 to as high as 100,000. Long life . . . no moving parts.



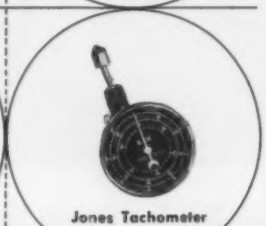
COMPLETE SELECTION OF

***Speed* MEASURING INSTRUMENTS**

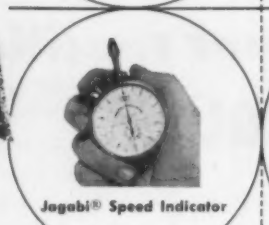
Jagabi® Tachometer

Dr. Horn Tachometer

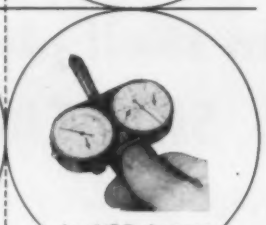
Metron Tachometer



Jones Tachometer



Jagabi® Speed Indicator



Jagabi® Tachoscope

The range of speed measuring instruments available at Biddle gives you a complete selection from resonant reed to centrifugal and chronometric types. Bulletin 35-PL includes a Handy Selection Chart, and descriptions of all the tachometers in the Biddle line. Whether you want readings of instantaneous speeds, variations in speeds, or average measuring in RPM or FPM, let us recommend the proper instrument for you. "It's easy to be sure—Just be sure it's from Biddle."

Write for BULLETIN 35-PL

B-617

JAMES G. BIDDLE CO.

• ELECTRICAL TESTING INSTRUMENTS
• SPEED MEASURING INSTRUMENTS
• LABORATORY & SCIENTIFIC EQUIPMENT

1316 ARCH STREET
PHILADELPHIA 7, PA.

For more facts circle 621 on Reply Card

NEW PRODUCTS

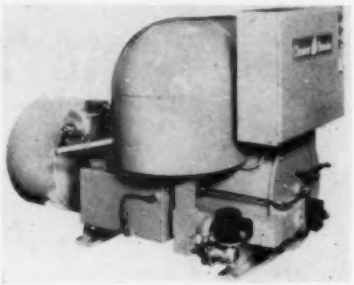
(Begins on page 156)

chine is its special circuit permitting a sharp spark discharge. The machining head comprises a non-rotating quill moved up and down by a servo motor, and the working tip is under constant action of this servo. An electronic feeler controls a sensitive mechanism that moves the tool to hold a pre-set gap and compensate for any tool erosion. No heat is generated in the tool, it is noted, and the electrode is isolated electrically from the mass of the machine.

In operation, the work is mounted in an oil pan resting on an adjustable table. A coolant pump circulates dielectric fluid to immerse the piece while work is in progress and remove the micro chips as they are eroded. The tool head is fitted with a soft metal electrode formed in the pattern to be cut in the work. Sparks jump the gap between electrode and work piece, it is pointed out, and molecules of metal are removed following the exact three-dimensional shape and design of the electrode. According to company, this unit works up to 12 times faster than many machines, and will shape any material, no matter how hard, as long as it is an electrical conductor. Abaco Industries, Inc.

51—GUN-TYPE BURNER uses No. 6 fuel oil

This 90-gph burner introduces a new method of burning residual oils. Air and oil are metered in proper ratio at all capacities to assure maximum efficiency, company explains, and oil is finely atom-



ized so that it burns easily, completely. A positive acting metering pump delivers the oil. Once the burner is set for the most efficient combustion it remains at that point. According to manufacturer, this burner does not start at full capacity but begins with a small flame which is gradually built up to the required size. The shape of the flame is adjusted for the type of boiler the burner is to be used with. Combustion controls are standard equipment. Cleaver-Brooks Co.

52—WELDING BLOWPIPE is light range unit

The Purox W-200 is a lightweight welding blowpipe with a welding range from 32 gage to 3/8-in. thick. This light range blowpipe is intended for production

STRATOPOWER Aircraft Hydraulic Pump

Vital to Modern Aircraft... AND Modern Industry— FLUID POWER

WATERTOWN DIVISION

Watertown, N. Y.

Railroad air brake equipment of all types, STRATOPOWER Hydraulic Pumps for Aircraft, to 3000 psi.

KALAMAZOO DIVISION

Kalamazoo, Mich.

HYDRECO Gear-Type Hydraulic Pumps, 3 to 120 gpm; Fluid Motors, 3 to 52 hp; Cylinders; Control and Auxiliary Valves; 1500 psi. DUDCO Dual-Vane Hydraulic Pumps, 3 to 120 gpm; Fluid Motors, 7 to 140 hp; 2000 psi operation.

AURORA PUMP DIVISION

Aurora, Ill.

Liquid Handling Pumps, AURORA Centrifugals and deep well Turbines, 7000 gpm, 500 ft. heads. APCO Turbine-type, 150 gpm, 600 ft. heads. Condensate Return Units.

KINNEY MANUFACTURING DIVISION

Boston, Mass.

KINNEY Vacuum Pumps, 0.2 micron, capacity to 5000 cfm; KINNEY Rotating Plunger and Heliquad Liquid Handling Pumps, to 3000 gpm.

VACUUM EQUIPMENT DIVISION

Philadelphia, Pa.

Complete KINNEY Vacuum Systems, Equipment and Components, Vacuum Research and Engineering.

Forces are so great and response requirements so exacting at today's air speeds that no man is strong enough or quick enough to adjust controls for even the simplest maneuver. Yet, a STRATOPOWER Hydraulic Pump, smaller than a football, provides Fluid Power that enables a pilot, with no more than a "fingertip flip," to perform, precisely and instantly, a dozen jobs. Among these are: raising and lowering landing gear, operating control surfaces or wing flaps. And, STRATOPOWER Pumps with their amazing weight/horsepower ratio perform many other supplementary chores in the air such as: powering air conditioning and pressurizing equipment, radar scanners and other jobs that Fluid Power does better.

More and more, industry looks to Fluid Power to perform functions more rapidly, more perfectly, more economically. Today's Materials Handling equipment is one example wherein HYDRECO Hydraulic Gear Pumps and Motors, Valves and Cylinders have saved untold millions of man hours. DUDCO Dual-Vane Hydraulic Pumps and Motors bring to Machine Tools and Mobile Equipment the advantages of 2000 psi continuous operation. Engineers of The New York Air Brake Company are ready to render assistance wherever a Fluid Power problem exists or may be considered.

In addition to two Divisions specializing in Power Hydraulics, there is valuable "know-how" in Liquid Handling at Aurora Pump and Kinney Mfg. Divisions plus intimate knowledge of Vacuum Processing in the Kinney Mfg. Division.

As Fluid Power plays an increasingly important role on land, sea and in the air, it becomes more important to you to become better acquainted with new developments of The New York Air Brake Company.

Write today for FREE literature from the N.Y.A.B. Division whose products are of interest to you.

THE NEW YORK AIR BRAKE COMPANY

230 PARK AVENUE • NEW YORK 17, N. Y.

INTERNATIONAL SALES OFFICE, 90 WEST ST., NEW YORK 6, N. Y.

For more facts circle 622 on Reply Card

TOUGH **TWO-BRAKE** HOIST HANDLES LOADS SAFELY

Heavy-duty lifting is easy work for the Series "600" 'Load Lifter' Electric Hoist. Every part is tough and thoroughly reliable to protect man, load and hoist completely. The motor brake and the load brake act together, automatically. Each alone has the power to hold the load safely. Braking is so fast, the load doesn't drop back — accurate spotting is always assured.

The Series "600" 'Load Lifter' cuts hoisting time – lifts a ½-ton load at 30 FPM – at the push of a button. And, there are only 24 volts at the push buttons for extra safety. There is extra safety, too, in the aluminum alloy frame, rugged gearing, tough wire rope and non-fracturing hook. Construction is so simple, the hoist can be serviced in the air.

In every respect, the Series "600" 'Load Lifter' Electric Hoist gives you quality and performance that save on every lift. Capacities: ½ and 1 ton. Available in all types of suspension, including motorized trolley. *Get details from your "Shaw-Box" Distributor or write us for Bulletin 408.*

MAXWELL MANNING M&M & MOORE INC. TRADE MARK

'Load Lifter'® ELECTRIC HOISTS

MANNING, MAXWELL & MOORE, INC.
MUSKEGON, MICHIGAN

Builders of "SHAW-BOX" and 'LOAD LIFTER' Cranes, 'BUDGIT' and 'LOAD LIFTER' Hoists and other lifting specialties. Makers of 'ASHCROFT' Gauges, 'HANCOCK' Valves, 'CONSOLIDATED' Safety and Relief Valves, 'AMERICAN' and 'AMERICAN-MICROSEN' Industrial Instruments, and Aircraft Products.

For more facts circle 623 on Reply Card

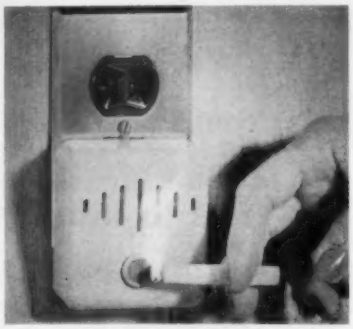
NEW PRODUCTS

(Begins on page 156)

welding in small parts manufacture, and for repair and maintenance operations. Nine quick-change heads seal gas tight to the blowpipe handle by means of O-rings and can be turned on the handle while welding, company points out, and all head sizes resist popping caused by short flames or overheating due to heavy work. Forward valves give the operator control of heat output for critical work. A cutting attachment is available for adapting the blowpipe for cutting iron and steel up to 2 in. thick. Form 50181 gives details. Linde Air Products Co.

53—TINY FIRE ALARM plugs into a-c outlet

Installed by plugging into a standard a-c outlet, the Fire-Spy is reported to shriek an ear-splitting alarm at the first sign of fire or ominous overheating. It can be "planted" wherever history or hunch indicate that fire may gain costly headway before being detected. This portable,



reusable alarm draws no current except when signaling. To assure adequate time for fight or flight, the thermostat is designed to trigger the alarm when heat reaches 140 F, and continue it until conditions return to normal—about 100 F. The alarm can be tested from time to time by holding a lighted cigarette or match to the circular thermostat button on its face. It costs less than $7.00, weighs about 6 oz, and may be used alone or as a companion system to other fire detection and fighting systems. Laramie Chemical Corp.

54—CONVEYOR BELT is nylon-filled for strength

According to company, a belt made with five plies of Nyfil 120-RS fabric is as strong as steel cord belt rated at 1000 lb per in. per ply, and it would take 20 plies of 42-oz cotton fabric to provide the same strength. Nyfil 120-RS is described as a combination of super strength rayon with nylon filler which permits belt operating tensions up to 200 lb per inch. per ply width. Company says that such a belt—42-in. wide—carrying coal at a rate of 700 tons per hr and traveling 600 fpm can lift its load 852 ft in a slope length

before

after

Modern Dravo heating saves this plant $6732 per year, frees 3400 sq. ft. of floor space

Sharp increases in heating costs traveled hand-in-hand with growth and expansion at Ideal Electric and Manufacturing Company's Mansfield, Ohio plant.

As manufacturing additions went on over the years, more and more hand-fired coal stoves were employed to heat new areas. Until recently, heating for the seven-acre plant area was handled by thirty-two such units. Heating problems never seemed to cease. With the lack of uniformity in heating, workers either froze or baked. Coal and labor costs (it took almost the full time of 5 men to fire stoves around the clock) never stopped climbing. Stoves and their bins gobbled up more than 4000 square feet of plant space!

When modern Dravo gas-fired, forced-air space heaters were installed, these problems disappeared, and the savings were immediate and substantial. Since eleven Dravo "Counterflo" heaters provided comfortable heat everywhere in the plant areas, 3600 square feet of valuable space was released ("Counterflo" heaters required only 600 square feet). But, more important was the actual gross savings of $6732 made possible last winter, '54-'55, through the use of these Dravo Heaters. When amortizing this new and standby equipment over a 10 year period, a net savings of $2735 per year is realized!

Remarkable? Then you will want to see for yourself what unusual cost-savings and heating efficiency Dravo heaters can bring to your heating systems. Use the coupon below to get complete details. You'll find it always pays to investigate Dravo Heaters!

Dravo Corporation, Department A-1309
Fifth & Liberty Avenues
Pittsburgh 22, Pa.

I am interested in Dravo Heaters for

_____

☐ Please send literature
☐ Please have representative call

DRAVO
CORPORATION
Pittsburgh 22, Pennsylvania
Representatives in all principal cities

Name_____

Company_____

Address_____

City_____ Zone_____ State_____

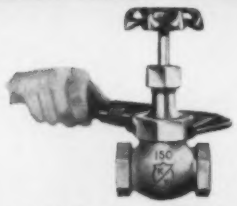
For more facts circle 624 on Reply Card

KENNEDY Quality Means *Extra Value* In Every Valve

The valve designed with rugged body construction for trouble-free service, with new disc features for longer service life.

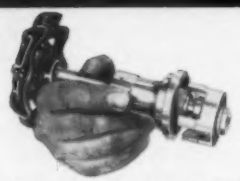
Here is the bronze valve of maximum durability and efficiency. Designed for versatility and longer life, it has rugged body construction with raised seat, generous interior passages, and ample pipe thread clearances. It features the comfortable, safe, pistol-grip handwheel; the Kenalloy stem, designed to eliminate the common causes of stem failures; and new improved impregnated plastic packing material, carefully tested and perfected. All these factors combine to make Kennedy the Quality valve.

• UNION BONNET RING •



Separate union bonnet ring is of heavy construction to absorb greater punishment. Large flats mean easier wrench application.

• SLIP-ON DISC-HOLDER •



With stem turned to wide open position, slip-on disc holder is locked positively in place . . . for easy reassembly.

• REMOVABLE DISC-HOLDER •

With bonnet assembly removed, a mere half-turn of stem releases disc-holder. Accurately guided by four guide prongs.

BRAZING SOCKETS
Fig. 89 is available with brazing sockets. To specify, ad letters "BS" to Figure number of valve.

THE KENNEDY VALVE MFG. CO. • ELMIRA, N. Y.
VALVES • PIPE FITTINGS • FIRE HYDRANTS

OFFICE AND WAREHOUSES IN NEW YORK CHICAGO SAN FRANCISCO ATLANTA SALES REPRESENTATIVES IN PRINCIPAL CITIES

For more facts circle 625 on Reply Card

NEW PRODUCTS

(Begins on page 156)

distance, pulley to pulley, of 3,290 ft.

Advantages of longer single flights of belt pointed out include elimination of transfer points, reduced installation and maintenance costs and longer belt life, since loads on longer belts are deposited less frequently at any given point on belt. Belts made with resilient nylon filler are said to have exceptional flexibility for better troughing and outstanding resistance to impact. High strength nylon is also said to provide crosswise strength in belts and an improved base for holding mechanical fasteners. B. F. Goodrich Industrial Products Co.

55—DETACHABLE COUPLER for air, oil, grease lines

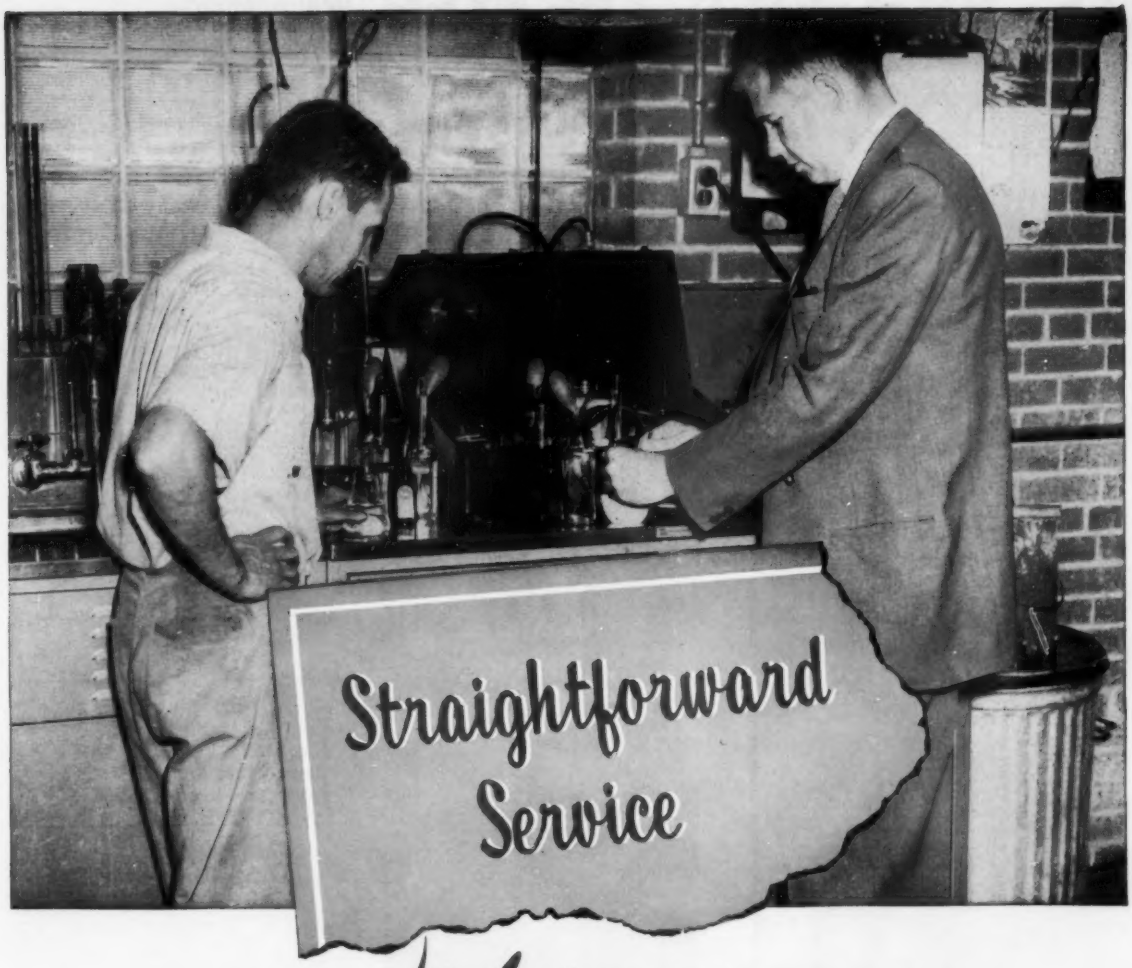
FosterMatic Quick Detachable Couplers are designed to provide automatic plug-in and snap-out coupling for air, oil or grease lines. According to manufacturer,

their "floating carrier" holds "dogs" in position and absorbs vibration, eliminating housing wear and "balls." The couplers can be used directly with reciprocating air tools without using lead hoses. Designed for heavy duty service, they feature compact size, lighter weight and greater air capacity. Information is in Catalog G-1. Foster Mfg. Co., Inc.

56—POWER TOOL has automatic torque control

Utilizing the "torsion bar" principle for automatic control, this tool is designed to run down fastenings with greater power and speed to a preset torque, then automatically shut itself off when preset torque is reached. The Torsion Bar Torque Control Size 5UT Impactool is expected to have application in assembly of metal products, in building and construction, and wherever nuts, bolts, studs or screws must be run to precise torques. The tool is reversible, with full power delivered in both directions. If specific torque is not desired, the knob controlling the automatic shut-off device is turned to off position. With standard accessories, this tool can be used to drill metal, masonry or wood; ream; tap; drive screws, or do wire brush or hole saw work within its rated capacity up to 5/8-in. bolt diameter.

Setting tool to desired torque is done by holding the "torsion bar" in a vise and using a wrench to turn the bar to desired reading. Setting may be made for left or right thread torque. Two "torsion bars" are available, giving a



from Your *Nalco*® REPRESENTATIVE

● Nalco Representatives make friends and permanent Nalco System users with a simple formula: honest water treatment service.

You can ask your Nalco Representative questions and get straightforward answers . . . And if you stump him, he—and you—can put the whole Nalco Laboratories' and Service staffs to work on a plain-language plan of action to get you better water treatment results, most economically.

If you are not already getting the security from water treatment troubles that regular calls from your Nalco Representative bring, call or write today for prompt action.

Nalco WATER TECHS

A paper on "A Laboratory Method for the Study of Steam Condensate Corrosion Inhibitors," presented at the 8th Annual Conference, National Association of Corrosion Engineers, has been reprinted by Nalco for distribution to men interested in this problem. Your copy will be sent free upon request.

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THE *Nalco* SYSTEM . . . Serving Industry through Practical Applied Science

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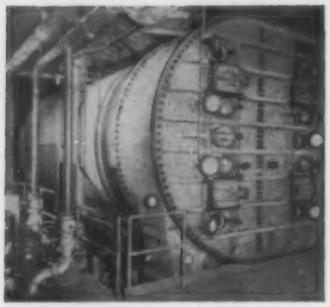
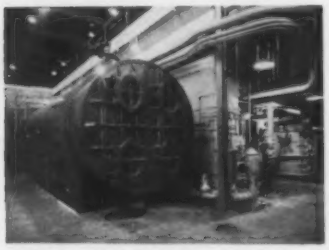
The BIGGER the BETTER

CONSECO

CONDENSERS

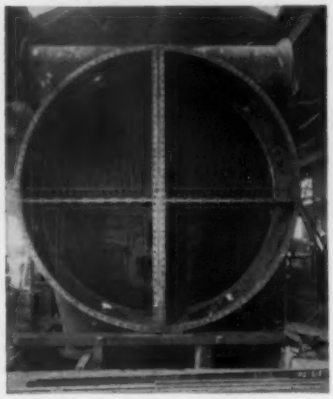


Three 70,000 sq. ft. units, City of Los Angeles, Cal.

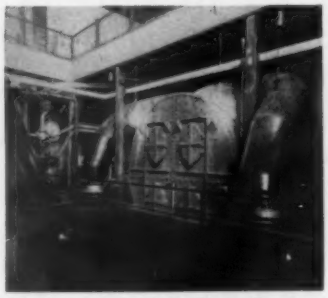


28,000 sq ft. unit, City of Owensboro, Kentucky.

One 45,000 sq. ft. unit and two 20,000 sq. ft. units. Puerto Rico Water Resources.



33,000 sq. ft. unit, Penn Power Company, Newcastle, Pa. Under construction.



33,000 sq. ft. unit Penn Power Company, Newcastle, Pa. Installed.

OTHER INSTALLATIONS INCLUDE

One 30,000 sq. ft. unit, Northern State Power Corporation.
One 35,000 sq. ft. unit and three 12,000 sq. ft. units, for Dairyland Power Corporation.

UNDER CONSTRUCTION

One 45,000 sq ft. unit for Transit Authority, N. Y. C.
One 35,000 sq. ft. unit for Maryland Power Corporation.
One 27,000 sq. ft. unit for City of Detroit, Michigan.

NO matter what size units you need, CONSECO gives you what it takes to produce them . . . experienced engineering, sound design, dependable manufacture, better performance . . . at lowest ultimate cost. *Descriptive Bulletins on request.*

CONSECO DESIGNS AND BUILDS

Heat Exchangers • Condensers • Evaporators
Steam Jet Air Ejectors • Steam Generators
Pressure Vessels • Centrifuges • Filters
Strainers • Pumps • Instruments and Specialties.

CONDENSER SERVICE & ENGINEERING CO., INC. CONSECO

Designers and Builders of Equipment for Power, Refining, Chemical and Marine Industries

72 BLOOMFIELD STREET
HOBOKEN, N. J.

For more facts circle 627 on Reply Card

NEW PRODUCTS

(Begins on page 156)

torque range from 20 to 90 ft-lb. Torque setting remains constant for any nut-running operation until adjustment is changed. Since the torque control does not depend on the operator's sense of timing, the tool can be used by inexperienced operators.

Action of the mechanism is likened to that of a pogo stick, which bounces evenly on soft ground, but rebounds higher when it strikes a hard surface. While the nut is being run to required torque, the Torque Control Impactool operates at normal power and speed, company explains; but when required torque is reached, and nut-running resistance is equal to the stress present in the "torsion bar," the impact mechanism rebounds instantly and trips the shut-off switch. This tool has a ½-in. square drive, weighs only 6½ lb., and has an overall length of 10¼ in. less "torsion bar." It has an approximate free speed (forward or reverse) of 1900 rpm, delivers 1900 impacts per minute. It comes with or without accessories for operation on 110 or 220 v ac-dc. Ingersoll-Rand Co.

One of these products may be "just what you're looking for." Use the handy Reader Service Cards to ask for more information on it.

57—ALUMINUM LADDER for construction, maintenance

Aluminum lightness combined with strength of design, immunity to rust, rot or mildew, and resistance to corrosion are features announced for this heavy-duty aluminum step ladder. It comes in sizes from 4 to 14 ft and has rubber pads on feet to prevent slipping and marring floors. It has strong front and rear rails, manufacturer points out, the front rails being made of 1 by 3⅞ in. channel 6063 T-6 alloy. Rear rungs are double-braced ¾ by 1⅝ in. channel 6062 T-6 alloy. Bulletin L-87 gives complete specifications. Patent Scaffolding Co., Inc.

58—MERCURY LAMP has interior phosphor reflector

This 1000-w mercury lamp has an interior phosphor reflector which directs two-thirds of the light downward. According to company, this lamp is in the same group of lamps which includes a clear glass 1000-w mercury lamp and a phosphor-coated one with improved color. The lamp has phosphor coating on the base half so that only a third of the light output is directed up. Thus, less light is controlled by the external lighting fixture. Company engineers say that at a given lighting level the cost of lighting from this new lamp should be about 15 per cent lower than that of the phosphor-coated mercury lamp with improved color. A

Two completely *NEW* gas tractors ...by MERCURY

The MERCURY "Huskie" and "Super-Huskie" were designed for rugged service—built to move mountains of material for long, continuous hours. Working either inside or outside, on level ground or on steep grades, in any type of weather, these new models will move your tonnage, regardless of size, shape or weight, for less. Utilize the power of these new models for your material handling operations.

MERCURY *Huskie*

MODELS 930 and 940 GAS TRACTORS

4 Wheels—DBP of 3,000 and 4,000 lbs., respectively

AVAILABLE IN LPG OR REGULAR GASOLINE MODELS

- ★ Six cylinder industrial engine—heavy duty clutch —fluid coupling and synchromesh transmission with provision for power take-off.
- ★ Full spring suspension—standard with all MERCURY tractors.
- ★ Smooth, functional body . . . frame, bumpers and fenders welded to form integral unit.
- ★ Unusual accessibility to all component parts.
- ★ Tops in operator comfort.

OPTIONAL EQUIPMENT:

1. L.P. Gas fuel system.
2. Torque converter and planetary transmission providing two speeds forward and one reverse, eliminating clutch pedal.

MERCURY *"Super Huskie"*

MODEL 950 – Gas Tractor

Specifically designed for extra-heavy duty, the MERCURY "Super-Huskie" is a 6-wheel model developing a D.B.P. of 5,000 lbs. It incorporates the same features designed into the new "Huskie."

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Send me the following Mercury Bulletins:

- ☐ T-103 – Model 930, "Huskie" Gas Tractor
- ☐ T-104 – Model 940, "Huskie" Gas Tractor
- ☐ T-105 – Model 950, "Super-Huskie" Gas Tractor

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They Resist Sharp Shocks and Jolts . . . Carry Twice the Load of Cast Wheels

To solve your breakdown problems Faultless developed this Drawn Steel Wheel.

With sturdy double-steel flat tread, it defies the punishment of sudden jolts. Chip-proof rounded edges are precision-made to roll smoothly and evenly—without fracturing—on any kind of floor.

Added strength and durability are provided by corrugated steel sides and a strong hub bearing, protected by mighty built-in steel shoulders. This wheel is absolutely concentric for smooth, effortless operation. *And it cuts into handling costs by reducing replacement labor.*

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Capable of supporting operating loads of 2,000 lbs. per wheel (or static loads of 8,000 lbs. per wheel), Faultless Drawn Steel Wheels may now be had for light, medium or heavy duty requirements.

In addition to 8 types of Swivel Plate Casters with Drawn Steel Wheels, companion Rigid Plate Casters are available.

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For more facts circle 629 on Reply Card

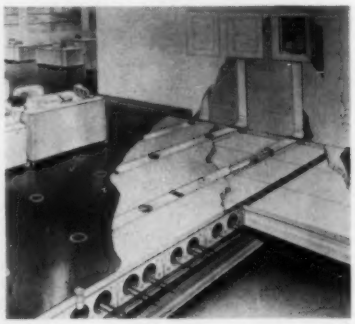
NEW PRODUCTS

(Begins on page 156)

lighting system using it offers better maintenance and improved distribution as well as some color improvement. It is 15-1/16 in. long, has a mogul base, is rated at 53,000 lumens and will cost around $56. It is intended for medium and high mounting in industrial installations. It operates at 265 v. A companion lamp, operating at 135 v, will also be made. General Electric Co.

59—FLOOR SYSTEM of electrified cellular concrete

This precast structural concrete floor system with underfloor electrical distribution, for plant office buildings, uses hollow cells in precast concrete floors as electric raceways and provides electrical floor outlet spacing as close as 5⅓ in. It is also designed to permit installation of new outlets at any time in



the future, at nearly any location on the floor. In addition to providing electric availability two principal advantages are attributed to the system: the structural floor, being of concrete, requires no fireproofing, and its design permits clear spans of 20 ft without use of intermediate beams.

The floor is electrified by metal feeder ducts installed on top of the structural floor in a 1½-in. concrete fill. These run at right angles to and feed the cells in the floor which are continuous from one end of the building to the other. The system offers economy and fast installation, it is pointed out. The structural floor is precast and requires no on-the-job pours of structural concrete, permitting high-speed construction on structural steel, reinforced concrete frame or masonry bearing walls. Fittings for the wiring system (distributed by The Conduflor Corp.) are prefabricated and are installed after the slabs are erected. The Flexicore Co., Inc.

60—SPRAY PAINT has "close drying" overspray

Dri-Mist Spray Finishes are formulated to eliminate overspray mist damage. The material covers in one coat, says manufacturer, and its overspray dries within a few feet of the surface—a dry rag will

For more facts circle 630 on Reply Card

ENGINE TEST DEPARTMENT
Engines are automatically routed onto free lines feeding into the test stand area. They seek out empty test stands automatically, and if all the test stands are filled, engines circulate around the power and free system until a test stand is vacant.

Overhead Automation

OF MATERIALS MOVEMENT AND STORAGE

One of the largest manufacturers of automobiles achieved a high degree of automation in his engine plant by utilizing a Webb power and free conveyor system. A network of 14 conveyors, 8000 feet in length, ties all the various plant areas together into one automatically controlled system. Extending through engine assembly, test, repair and shipping, the conveyor system provides (1) on-the-conveyor assembly of engines, (2) mobile overhead storage, (3) on-conveyor testing, (4) live bank areas for work in process.

This Webb power and free conveyor system provides considerable flexibility in plant operation. It permits greater control in work flow, allows varying speeds between conveyors in the system, permits materials to be switched automatically onto free lines for stationary operations and storage, and simplifies transfer of loads between conveyors.

If you are looking for greater efficiency in your materials handling operations . . . if you are looking for additional floor space . . . for added profits from lowered production costs, contact your nearest Webb office. Write for Catalog No. 52.

OVERHEAD STORAGE BANK
Webb power and free systems provide for overhead storage of materials, leaving valuable floor space clear for production operations.

SINGLE CONTROL CONSOLE
This control console provides complete synchronization of the 14 conveyor lines. The entire system is displayed on the vertical panel. Calibrating dials on the console permit the changing of speed for conveyors in the system as desired.

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AMVIT* JOINTED CLAY PIPE gains wide acceptance,

Resists Acid Attack in Industrial Waste Lines

Never before has a new product gained such wide acceptance and usage in such a short period of time.

In the first year since Amvit Jointed Clay Pipe was introduced more than 60 major installations have been completed with outstanding results.

Field tests from these installations show that ground water infiltration can be controlled and prevented—thus reducing pumping and treatment plant costs. Amvit is a compression type joint on the ball and socket principle. Nothing can enter the line after it is complete.

Quick Installation Saves Labor

Since no other material such as caulking, joint compound, hot-pots or ladles are needed to make the Amvit Joint, installation is quick and easy. The joint is on the pipe delivered to the job ready to use. Savings with Amvit Jointed Clay Pipe mean *lower cost of pipe in place* when the line must meet a rigid test.

Amvit Jointed Clay Pipe, in sizes 4" through 24", together with all fittings is available for immediate delivery in the Northeast and Central States.

For more information, write or call American Vitrified Products Company, National City Bank Building, Cleveland, Ohio, or our office nearest you.

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For more facts circle 631 on Reply Card

NEW PRODUCTS

(Begins on page 156)

wipe it off the floors, machinery, etc. When heavy film thickness is desired, this paint can be applied in heavy coats because of its quick-drying quality. It is claimed that dust, fly ash and loose dirt will not adhere to the film. For use on wood, steel, masonry and wall surfaces, Dri-Mist comes in white and aluminum. The former can be tinted with regular oil colors. Morris Paint.

61—PALLET TRUCK for loads up to a ton

For easier and faster handling of pallet loads up to one ton, the HX Foot-Lift Hydraulic Hand Pallet Truck weighs less than 200 lb. At the same time it is built for long service, says manufacturer, with ribbed design, in proper direction of

stresses to which lift trucks are subjected in operation. The forks have a 4½-in. lift, and the "flying saucer" feature (pallet entry rollers) are designed for greater ease when entering pallets. The load is raised to travel operation by foot treadle. This is attached to the pull handle, which allows lift operation from any angle. Operation in narrow quarters is assured by a short wheelbase, says manufacturer, and the price of this truck is reported moderate. Barrett-Cravens Co.

62—CONTROL CONSOLETTE is compact, low cost

The compact Model MI-14980 is an "economy size" consolette engineered for plants requiring an economical intercommunication system which can also be used for program distribution. The unit measures only 22 in. wide and can be mounted on a desk. This sound consolette is designed to provide facilities for communicating with up to 16 rooms and incorporates a program or input source for distributing entertainment or educational programs from radio, tape recorder, phonograph records, or the unit's combination monitor-microphone. Provisions are incorporated for addition of supplementary audio inputs.

Self-contained, the new consolette has a 10-w amplifier with frequency range of

THIS IS THE STORY of three men and a VALVE. Joe, a chemical engineer, needed valves that could handle tough corrosives. Bill, a refining engineer was looking for valves that gave a positive shut-off. Tom, working for a large industrial firm, needed valves that sealed both upstream and downstream. All three solved their problems by specifying Hamer Visible Wedge Valves. These remarkable valves combine the double sealing action of precision metal-to-metal fit augmented by dependable seal rings. The wedges are trimmed with nickel, while seats are trimmed with stainless steel to withstand the roughest corrosive conditions. The full-view wedges are handwheel operated --can't blow out or drop on a toe. The wedges pivot so no lifting is necessary. So if your plans require long service, sure-seal shut-off valves, by all means specify

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The slings you use have to be the best. There's too much at stake—the safety of your crew, your equipment and the material they're handling. How can you make sure that the slings you have are the best available? Ask your supplier these questions:

Does the maker produce his own steel?

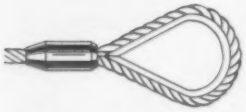
Then does he carefully test the results?

Does he process this superior steel into top-quality wire?

Then does he carefully test the results?

Does he make this superior wire into top-quality wire rope?

Then does he carefully test the results?



Does he fabricate this superior wire rope into top-quality slings?

Then does he carefully test the results?

If you receive even a single "no", it'll pay you to get the Wickwire story . . . to see how Wickwire Wire Rope Slings are made—from blast furnace to testing of the completed sling—by a *single* company with over a century and a quarter of wire-making experience. Contact the nearest sales office below today.

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WIRE ROPE SLINGS
PRODUCT OF WICKWIRE SPENCER STEEL DIVISION
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For more facts circle 633 on Reply Card

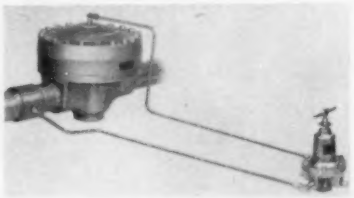
NEW PRODUCTS

(Begins on page 156)

50 to 15,000 cycles; a balanced 70-v output; low impedance; and a monitor loudspeaker which serves also as a microphone. A press-to-talk key is used for intercommunication operations. Program distribution is controlled by a single three-position switch which includes an all-call position, to provide automatic cut off of programs for priority announcements. Individual push-button switches are incorporated for selection of any one or combination of rooms for reception of messages or program material. Radio Corp. of America.

63—AIR REGULATOR affords pressure control

Model 20AA-16 Air Pressure Regulator is a 2-in. pilot-controlled, high capacity regulator for precision in air control over a wide operation range. It is designed to reduce line pressures of up to 400 psi to working pressures from 2 to 125 psi. Its temperature range is from



—40 to 200 F. Valve construction of this regulator is balanced to provide a more accurate pressure control, minimizing the effect of a fluctuating primary pressure. It is pointed out that the constant control pressure maintained by the pilot regulator makes possible a greater valve opening. The device is described as having high air flow capacity with larger unrestricted air passages and a large diameter seat. A pressurized chamber provides the control medium. The unit is compact and simple to install where space is a problem, company notes. Remotely controlled, this regulator can be installed at any point in the air system, regardless of accessibility. The pilot regulator can then be installed in a convenient location for easy adjustment of working pressure. C. A. Norgren Co.

64—FLOOR COATING is decorative and protective

Colorflex Plus AWA, a decorative and protective coating for floor surfaces, is designed to resist the alkali content of cement and not be affected by storage battery acid, lactic acid, fruit or vegetable acid or be softened by water, mineral oils, grease or gasoline. Coating is declared suitable for use on practically all surfaces —inside or outside—in food plants, garages, laundries, engine rooms, washrooms, show rooms, offices. Penetrating synthetic resin base makes it an ideal solution to the problem of painting

Electronics Speed Production Control

Parts requirements scheduling...

for ten or more periods can now be computed and punched in a single card pass through the Univac* 120. Schedule cards for each end-product are collated with their related parts requirements cards, and the Univac 120 computes, checks and punches complete requirement figures for ten or more periods. This is done at a full 150 c.p.m., and in just a single card pass.

A 6-page folder showing actual program charts will be sent free on request. Circle TM1073.

*Registered in the U.S. Patent Office

Materials control for assembly lines.

The Univac File-Computer now makes it possible to go directly from production plans to vendor delivery schedules in less than 1% of the time previously required. This system provides: completely automatic scheduling of deliveries by weeks for the next two months, by months for third month and later periods; adequate working stocks – no overstocks, no rush orders.

You get complete details in a 6-page folder that will be sent free on request. Circle TM987 on the coupon below.

Production scheduling.

Regardless of the number of departments or products involved, SCHED-U-GRAPH tells you immediately – simply and visually – the status of all orders. A quick glance at SCHED-U-GRAPH and you know at once *where* the work is and *when* you can deliver. And you can schedule new orders promptly and accurately, with assurance that promised delivery dates will be met. The success of SCHED-U-GRAPH is directly proportional to the problems involved ... the greater the problems, the greater the success of SCHED-U-GRAPH.

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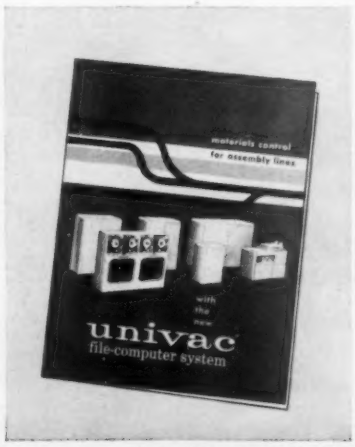

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Profit-Building IDEAS For Business

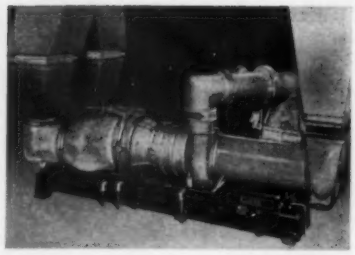
(Begins on page 156)

concrete, company points out, and it does a superior coloring and sealing job on wood, brick, composition and other surfaces. Flexrock Co.

65—GAS TURBINE for industrial applications

This unit develops 1130 Bhp and is described as well suited to stationary or portable power generation and to mechanical drives. Availability of this smaller capacity gas turbine for industrial use is the result of an agreement made by company with Ruston-Hornsby, Ltd. of England, for manufacture and sale of the Ruston Mark TA Gas Turbine in this country. Light weight, compactness, air cooling, fuel flexibility, ruggedness and long life are said to be inherent features of the Mark TA.

Typical areas of use are gas and fluid transmission where variable speed or high starting torque characteristics of a two-shaft turbine are required. It is also suggested for processes where power is required and where exhaust energy can



also be used for pre-heating or for steam generation. Refineries, process and petrochemical industries are expected to have ready application for the Mark TA, as will other plants requiring both power and heat. It is also suggested as an emergency power generating unit—its light weight and small size permit use where heavier units cannot be used.

This turbine operates on a simple open cycle. It is a dual shaft, series flow unit developing 1130 Bhp at 80 F and 1000 ft. Nominal low pressure or output turbine speed is 6000 rpm. Output speeds of 1500 and 1800 rpm are available for driving 50 or 60 cycle generators. This turbine is designed for normal operation at an inlet temperature of 1340 F. The design is said to permit full load within two minutes of initiating starting cycle. The unit embodies a single combustion chamber, easy accessibility for maintenance and inspection. Clark Bros. Co.

Colored Insulation for Industry with foster Lagtone

PROTECTION & COLOR-CODING COMBINED IN ONE RUGGED COATING FOR THERMAL INSULATION ON PIPES, DUCTS, VESSELS . . .

Now! A single protective coating for indoor and outdoor thermal insulations . . . combines the decorative advantages of seven attractive colors (plus black and white) with outstanding protection from weather, chemical fumes, and physical abuse.

Lagtone can be used over all insulating materials, and on heated or refrigerated piping, ducts, and equipment. Non-toxic . . . nonflammable . . . effective over wide extremes of ambient temperature.

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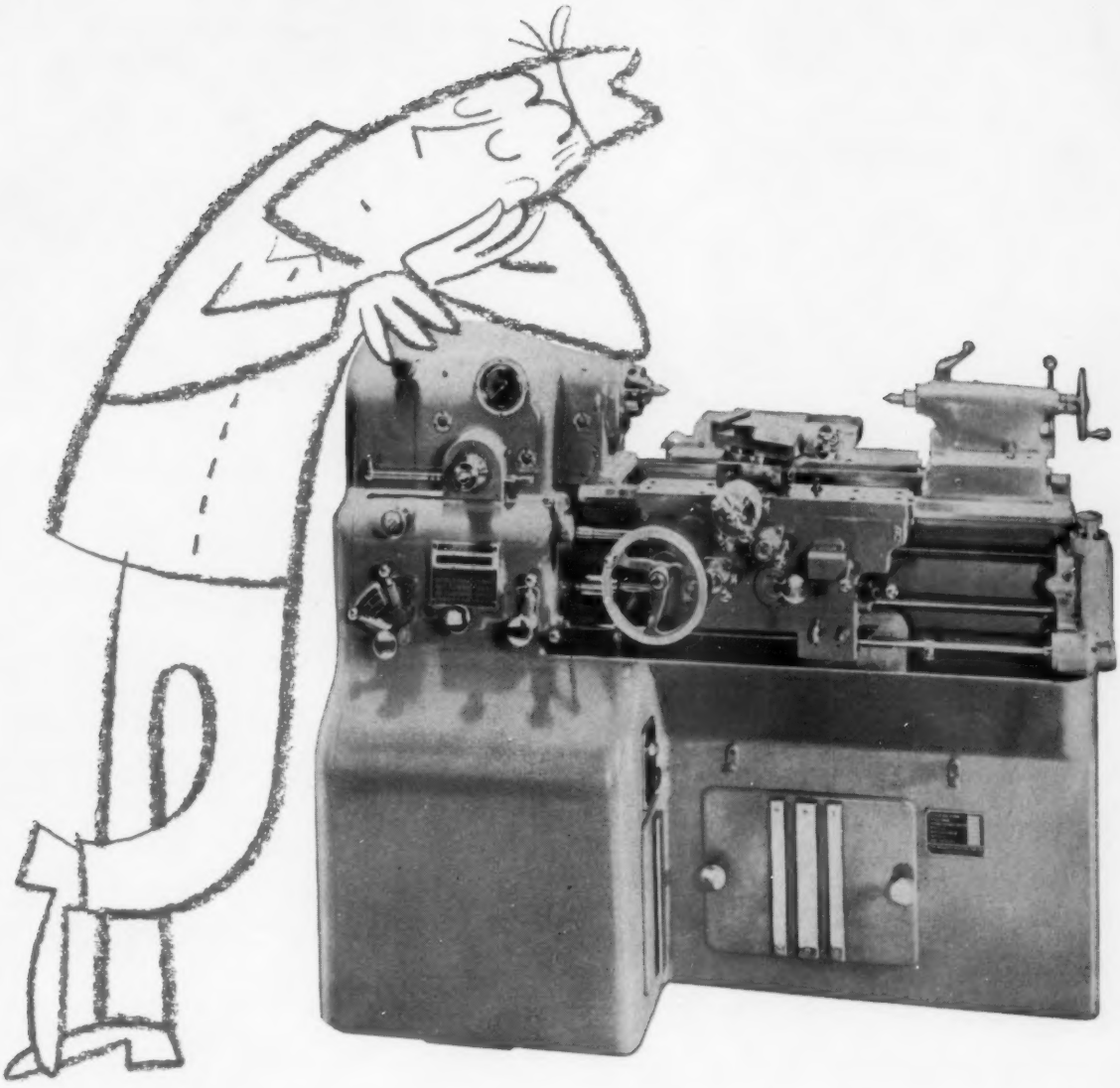
Reader Service Cards on pages 241-242 make it easy to get further information on any of these products. Just circle the item numbers of the products you would like to know more about.

66—CIRCUIT BREAKER for generator protection

Type FB-12 is a high speed d-c circuit breaker designed to operate at 1000 v and 1200 amp continuous. Its primary applications will be for protection of generators, and traction or driving motors; also for feeder breakers and, in multiple pole assemblies, for anode protection. Breaker was designed for extremely fast tripping and interruption of fault currents. It will interrupt in a total of 0.012 sec, limit current magnitude in 0.004 sec, and can be set for high speed tripping on either forward or reverse current. Unit is built in single and multiple pole assemblies, each with its own individual closing motor, and can be wired for individual pole reclosing or automatic reclosing. I-T-E Circuit Breaker Co.

67—ELECTRONIC SYSTEM for remote crane control

This electronic system is announced for remote control of traveling cranes from the plant floor. As carrier current over existing power rails is the only circuit



Why risk production downtime?
Keep it going with circuit breaker protection

Type "ETI" F frame breaker

Keeping a machine and its operator idle while locating and replacing a blown element costs industry countless thousands of dollars each year. There's no need for such waste. Replacing outmoded protective devices with I-T-E circuit breakers can cut this loss materially. Then when overloads or short circuits occur, there'll be no waiting, no costly machine downtime, no production bottlenecks, no replacement of parts. The tripped breaker is easily spotted and can be reset as soon as the fault is cleared.

Investigate the economy of circuit breaker protection. See your local I-T-E distributor today. Or write Small Air Circuit Breaker Division, I-T-E Circuit Breaker Company, 19th & Hamilton Sts., Phila. 30, Pa.

I-T-E

I-T-E CIRCUIT BREAKER COMPANY • Small Air Circuit Breaker Division

For more facts circle 636 on Reply Card

NEW PRODUCTS

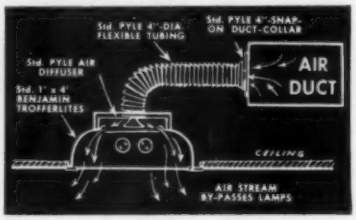
(Begins on page 136)

required, installation is simple for new or existing cranes. No additional power rails are required, says manufacturer. It is claimed that with this control, an operator can raise or lower the hoist (five positions), position the trolley forward or reverse (five positions); travel forward or reversed (three positions) and can energize or turn off the magnet, all from the floor. As many as eight cranes can be controlled on one power circuit by use of different carrier frequencies, according to company, and one operator can handle more than one crane. By use of two control panels, a crane can be loaded by one man and sent to the other end of its runways where another man can unload it and send it back.

In operation, high-speed synchronous relays on crane and floor panel operate whenever levers are moved. Carrier frequency on each step is shifted down to a lower frequency for an "off" control, up to a higher one for "on" control. An emergency stop switch is provided to cut off carrier and open control contactors if the relay system or carrier link should fail. The floor control panel may be in a permanent location, or placed on a cart for portability. Femco, Inc.

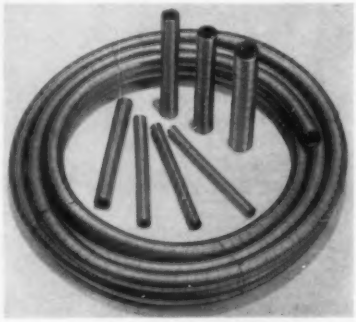
68—DUAL FIXTURE handles lighting, air conditioning

Called the Multi-Vent Trofferlite, this fixture is designed to diffuse conditioned air and provide illumination and to be adaptable to any drop-type ceiling. Jointly developed by Pyle-National Co. and Benjamin Electric Mfg. Co., the fixture is reported to simplify engineering, make possible cleaner, more attractive interior design, and lower initial cost. It is claimed to actually increase light output and improve the quality of air conditioning, as well as to eliminate dirt smudges on the ceiling. Where minimum cooling is needed, the fixture can remain unattached to the air duct or shut down. A booklet provides sound level charts and selection data on this fixture. Benjamin Electric Mfg. Co.



69—METAL TUBING enables low cost duct forming

Titeflex 500 is produced by a process which winds a thin metal strip into a tube of desired diameter, with a smooth bore on the inside and helical ridges on the outside. This construction is said to result in a tube that is lightweight yet has great strength and is resistant to external crushing forces. For construction applications tubing is made of



lead-coated steel strip for corrosion resistance. External ridges give tubing a good grip, anchoring it in concrete, and make it stiff enough so it can be positioned inside concrete forms. Thin gage metal permits bending by hand to fit even complex layouts, as well as cutting with knife, so that tubing can be hand-formed on the job.

Applications include building construction, to provide built-in ducts in concrete walls and floors for widely distributed wiring and piping lines; and for forming cable ducts in concrete-conduit housed underground power, telephone, or high frequency transmission

E. R. P. CATHODIC PROTECTION ...
INDIVIDUALLY DESIGNED FOR EACH APPLICATION

An effective installation that operates at the lowest cost per year requires experienced engineering evaluation of site and environmental conditions. The Electro Rust-Proofing Engineering Division makes available to you the cumulative experience gained in designing more than 10,000 cathodic protection systems.

Electro Rust-Proofing can furnish any one, or all, of the following services to help you provide proper cathodic protection for each of your jobs:

- Corrosion surveys and recommendations
- Design based on engineering experience
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- Service to assure proper operating results

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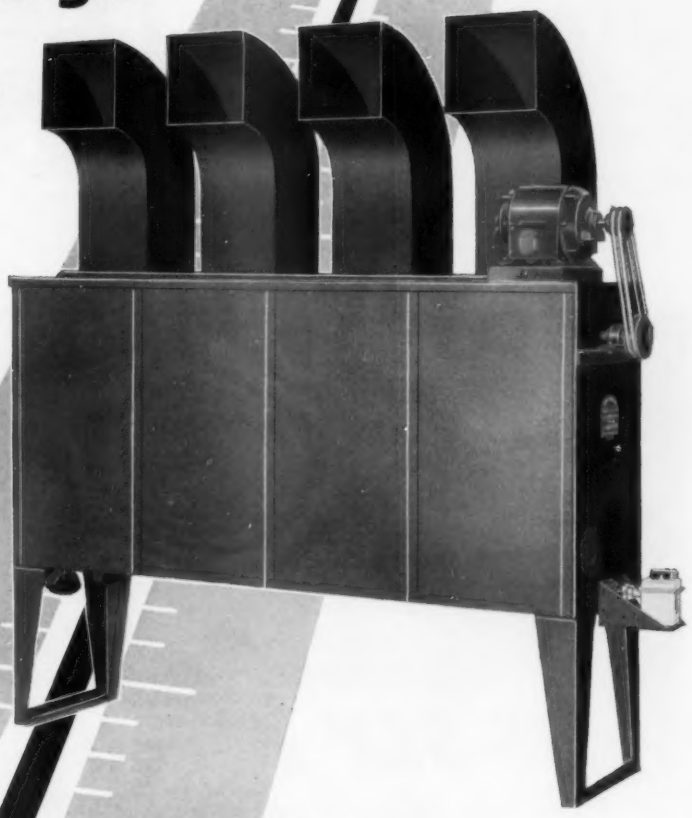
YOUR FUEL COSTS go down when Clarage Unitherms go in...



AMONG the many prominent users — Sutherland Paper with 13 Unitherms and 48 Clarco Unit Heaters (suspended models for smaller area service) in its newest plant.

Exclusive Feature saves you money

Clarage's unique Syncrotherm Control maintains uniform heating with relatively low temperature air in constant circulation. By-pass dampers control the amounts of air passing through and around heating coil. Result: better use of each BTU at lower cost. Investigate this and the other features of the Unitherm Unit Heater — available for steam or hot water operation, floor or ceiling installation, in a wide size range. Write for Catalog 1115. CLARAGE FAN COMPANY, Kalamazoo, Michigan.

CLARAGE . . . . . ***dependable equipment for making air your servant***

SALES ENGINEERING OFFICES IN ALL PRINCIPAL CITIES • IN CANADA: Canada Fans, Ltd., 4285 Richelieu St., Montreal

For more facts circle 638 on Reply Card

(Begins on page 156)

(concentric cable) lines. Company says its greatest application is ducting for housing the stressing cables in prestressed concrete, because of its good anchorage to concrete and smooth interior, which makes it easy to run in cables and permits easy flow of grout. Corrosion resistance provided by lead coating suggests use of this tubing weather-protective duct for exposed wiring or piping lines. It is available in seven sizes from ⅞ to 2 in. ID. Weight runs from 0.11 to 0.26 lb per foot, furnished in any length (with the standard minimum, and most economical, length at 120 ft). Titeflex, Inc.

70—POWER SWEEPER has three-speed transmission

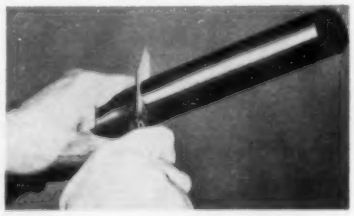
Powered electrically, the Model 605-E has a three-speed transmission forward, plus one in reverse. It operates with two motors—one for travel and one for power to brushes and vacuum. This prevents drain on the batteries when the sweeper is merely traveling to or from a job, it is noted, and enables the sweeper to operate a normal 8-hr day without recharging. Manufacturer notes that since there are no fumes or noise, the Model 605-E is well suited for use in air conditioned plants dealing with foods, chemicals and pharmaceuticals, as well as in public buildings. The sweeper is

capable of sweeping up to 70,000 sq ft per hour in open areas.

Features of the Model 605-E include Filter-Vac dust control which eliminates need for a dust bag to empty; dust is deposited in the main dirt hopper prior to entering the fan. Another feature is hydraulic power dumping in a compact pile at the rear of the sweeper while the driver is seated. Side brooms are available for the left or the right, or for both sides, and when combined with automotive type steering and a 5-ft turning radius, enable close sweeping possible under almost any conditions and in any direction. Sweeping swaths are 36-, 48- and 60-in. widths. Wayne Mfg. Co.

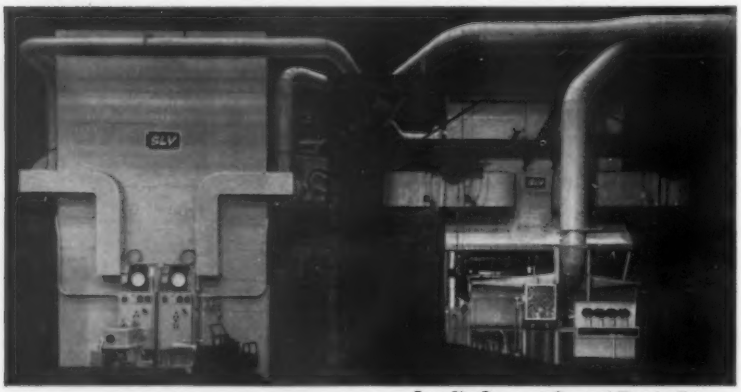
71—PLASTIC PIPE is flexible and lightweight

Supplex is announced as a non-toxic, pressure proved, general purpose flexible plastic pipe approved by the National Sanitation Foundation for piping water and other fluids for human or animal consumption. Features claimed include low cost, ease and speed of installation,



and permanence. Its light weight, flexibility and easy workability reduce installation time. Company notes that the smooth bore of this pipe reduces resistance to flow and permits a pump to deliver a greater rate of flow at the well-head or through the distribution system. Also, since lime and algae do not adhere to the smooth inner bore of this pipe, delivery rates remain stable.

The pipe is packaged in long coiled lengths. An 800-ft line of ½-in. Supplex Pipe, for instance, can be laid with only one fitting. Virgin polyethylene used in this pipe is reported highly resistant to



Four Sly Ovens at General Electric, Erie.

4 SLY Ovens Give Close Baking Control at G. E.

Correct baking of varnish on armatures, field coils and frames is essential to insure full protection to the units in later use. Four tower-type Sly Ovens at the Direct Current Motor and Generator Department at General Electric Co., Erie, Pa., provide the exact temperature required. They are an integral part of production, assuring a smooth, continuous flow.

The ovens are arranged in pairs. Each is a double-compartment oven with a common wall separating the zones. Each zone has its own heating and control system and individually automatic, program controlled conveyor system to meet the required, preheat, first and second baking operations. Complete cycle includes preheating, varnish dip, 4-hour bake, varnish dip and another 4-hour bake. Operations are such that the ovens reach their required temperatures prior to the start of the work day.

This installation is typical of the time and money savings Sly Convectioneered Ovens bring to drying, baking and finishing operations. *Write for catalog describing Sly's complete line.*

Designers and Manufacturers of: Dust Control Systems, Industrial Ovens, Blast Cleaning Equipment, Tumbling Mills.

THE W. W. SLY MANUFACTURING CO.

SINCE 1876

4600 TRAIN AVENUE • CLEVELAND 1, OHIO

OFFICES IN PRINCIPAL CITIES

For more facts circle 639 on Reply Card

Take Complete Advantage of the Latest Advancements in Factory Lighting with these 3 NEW BENJAMIN LIGHTING UNITS

Greater seeing comfort through more upward light. More light for the money with new higher-output fluorescent lamps. These are new trends in factory lighting. Trends that can help you get a greater return on your investment in machinery, equipment and personnel. Now, Benjamin offers a choice of three new lighting systems so you can take fullest advantage of these advancements. Each system embodies distinctive Benjamin design and construction features which add to its sustained efficiency and reduce maintenance and operation costs. When you specify Benjamin, you get the most out of the latest factory lighting advancements through outstanding features, such as those highlighted here. Benjamin Electric Mfg. Co., Des Plaines, Illinois.

1. Greater Upward Light
2. New 60" Apertured Top Reflector
BENJAMIN
3. The ONLY 800 ma. unit with metal-clad Springlox lampholders
MORE LIGHT UP means MORE SEEING COMFORT BELOW!

1. NEW RLM SD-1 Unit with 25% Upward Light

Seeing comfort in factories is greatly improved with this new Benjamin Upward Component Unit, certified by RLM. It provides higher quality lighting due to 25% upward light, 27° shielding and special high reflecting white porcelain enamel. In addition, it is the only 25% upward lighting unit with *Springlox* lampholders for easy-in, easy-out lamp replacement, and *Lok-Latch* fasteners for simplified reflector removal. Available for 48" and 96" T-12 Slimline, 48" T-12 40-w Rapid-Start, as well as T-12 800 ma. Rapid-Start* lamps.

**No RLM Standards on 800 ma. units*

2. NEW BENJAMIN UNITS FOR 60" T-17 bi-pin lamps

Expansion and re-styling of Benjamin's 90/100-w line means that you can now get RLM apertured-top reflectors with 15% uplight—as well as a complete line of open and closed-end porcelain enameled reflectors—in the popular 60" length. New molded plastic lampholders are mounted in steel housings for extra rigidity. Designed for two 60" T-17 bi-pin lamps.

3. NEW BENJAMIN UNITS for HIGHER LIGHT OUTPUT LAMPS—You get 40% more light from the new 800 ma. fluorescent lamps... and with the new Benjamin units you get even more for your money from these new lamps! "Lifetime" porcelain enameled reflectors with ultra-high reflectivity, deliver the fullest measure of high efficiency offered by these new lamps. Exclusive, metal-clad *Springlox* lampholders provide trouble-free lamp changing and reduction of lamp vibration to make sure you get *all* the extra-long life built into these new fluorescent lamps. A really complete line, too! Individual units or continuous lines; open or closed-end; solid or apertured tops; for two or three 48" or 96" 800 ma. Rapid-Start lamps.

Benjamin Industrial Lighting Equipment is Sold Exclusively Through Electrical Distributors

For more facts circle 640 on Reply Card

Best Port-of-Call for POWER FACTS:

22nd NATIONAL EXPOSITION of POWER & MECHANICAL ENGINEERING

Under auspices of ASME

NOV. 26-30, 1956—
in NEW YORK'S beautiful new COLISEUM

If your interest is in the efficient production—or use—of POWER of any kind, you should make a date to see the Power Show in November!

This bigger, better exposition features hundreds of informative exhibits of new equipment, new techniques, new applications . . . and ATOMIC ENERGY is covered in a special section!

Engineers, production men, executives all profit when they take time out to attend . . . just *one valuable idea* that is gained here may mean the difference between next year's profit and loss. Your visit is really an investment in the future!

And what a pleasant investment it is! Never before have you attended an exposition in such a modern, convenient, exhibition hall. What's more, the COLISEUM is only 4 minutes from the entertainment center of the world!

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22nd NATIONAL EXPOSITION of POWER & MECHANICAL ENGINEERING
480 Lexington Ave., New York 17, N. Y.
Management: INTERNATIONAL EXPOSITION COMPANY

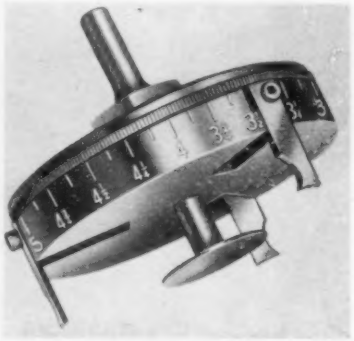
NEW PRODUCTS

(Begins on page 156)

acids, alkalis, and other corrosive chemicals, not subject to electrolytic corrosion and immune to rot or bacterial attack. Supplex Pipe comes in sizes of ½, ¾ and 1 in. in the 75-lb pressure rated series; in sizes of 1¼, 1½ and 2 in. in the standard wall series. Twin-pipe is available for jet well installations. Pipe may be used at temperatures from —50 to 125 F. American Hard Rubber Co.

72—HOLE CUTTER works on steel, brass, plastic, wood

This adjustable hole cutter will cut holes of various sizes in steel, brass, plastic, wood and other materials. The holes



can be from 2¼ to 5 in. diam. You dial to the size desired. The cutter blades are specially designed and heat treated. According to company, the tool has many uses besides hole cutting. Erwood Inc.

73—WELDING TORCH has quick shut-off valve

For production line, light gage welding and brazing jobs, the Airco Style 600 Shut-Off Torch is declared especially well suited for light work where intermittent welding is involved. It is described as a well balanced unit weighing only 14 oz; it is 7¼ in. long. A full line of tips, mixers and extensions are available for use with the torch. Its "quick shut-off valve" is designed to permit instantaneous closing of the gas passages so the operator can move from one weld-joint to another without loss of oxygen and acetylene and without carrying a "live" flame from one area to another. The quick acting lever is conveniently located between gas valve knobs on the handle. Air Reduction Co., Inc.

74—WEIGHING SYSTEM for fork lift trucks

This fork lift truck weighing system incorporates the Baldwin SR-4 load cell which is based on the bonded strain gage principle, and is hermetically sealed within a steel housing. Owing to the system of overload stops built into the system, substantial overloads can be handled without damage to equipment, it is stated.

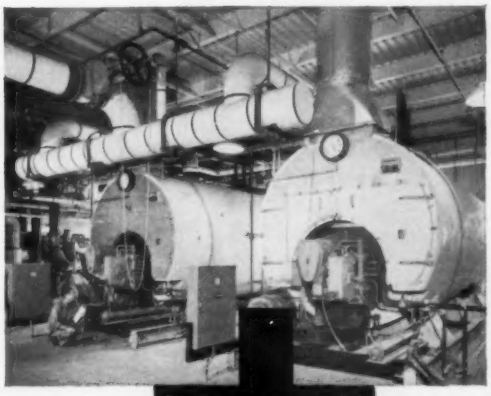
PACE-SETTER IN COMMUNICATIONS

CHOOSES "CRUISING SPEED" BOILERS

RCA Cherry Hill Project, Camden, N. J.
Archt—Vincent G. Kling, Philadelphia, Pa.
Engineer—Robert J. Sigel, Narberth, Pa.
Heating Contractor—Daniel J. Keating, Philadelphia, Pa.

Two "cruising speed" Kewanee Iron Fireman Boiler-Burner Units used for 'round the clock oil firing at RCA.

■ It's only natural an expert in one field would be satisfied with nothing less than a product manufactured by *experts*. And that's the reason Radio Corporation of America chose Kewanee Reserve Plus Rated Boilers for its new Cherry Hill project near Camden, N. J. Company officials wanted a boiler that met two specific requirements: (1) economical operation, (2) long life. They settled on Kewanee "cruising speed" Boilers with 50% extra built-in power. Like a smoothly-striding runner who holds back his final burst for the stretch drive, Kewanee's "cruising speed" boiler operation reserves its maximum power capacity until peak performance is demanded. Rated on nominal capacity, Kewanee Boilers give trouble-free performance with lower fuel and maintenance costs—higher efficiency and longer boiler life. Boilers rated on maximum capacity—those "going wide open" all the time—have no reserve, no "second wind," left for emergencies . . . are costly to operate and maintain . . . there's always the danger of mechanical failure caused by constant strain. So, just like RCA, make Kewanee Boilers *your* choice. Call the Kewanee man. He'll come sprinting to tell you about Kewanee's "cruising speed." KEWANEE BOILER DIVISION OF AMERICAN-STANDARD, 101 Franklin Street, Kewanee, Illinois.



KEWANEE
reserve plus rated

KEWANEE BOILERS

DIVISION OF AMERICAN-Standard

For more facts circle 642 on Reply Card

NEW PRODUCTS

(Begins on page 156)

Load on the forks is transmitted directly to the load sensing element. This device is relatively insensitive to load position, company notes, and when connected to the instrument it provides a system with weighing accuracy of ¼ per cent of full range.

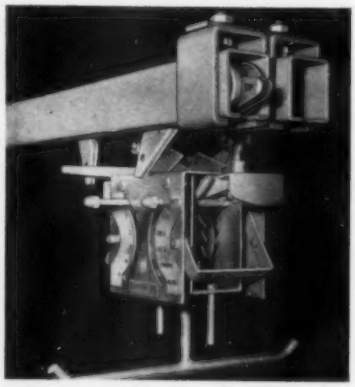
The system can be installed in the field. It is only necessary to remove fork bars, bolt load sensing device to lift brackets, replace fork bars, and mount instrument and plug in connecting cables. The 6 v required to power the instrument can be obtained from the truck battery. Variations in this voltage are claimed not to affect the inherent accuracy of the system. It will be available in standard truck capacities. Applications include weigh-counting for inventory control, batch process weighing, check-weighing incoming shipments and the weighing of interplant shipments. Electronics and Instrumentation Div., Baldwin-Lima Hamilton Corp.

75—GRATINGS, TREADS with non-skid surface

In Relgrit Gratings and Treads, a non-absorbent, hard, and tough abrasive is baked into V-shaped openings along the top edges of the grating bars. The abrasive is embedded about ⅛ in. in depth and extends above the bars. This process retains the advantages of open flooring, it is pointed out, and at the same time provides sure footing. The abrasive is claimed to present a premanent non-skid surface that is effective whether wet or dry, muddy or oil soaked, and not subject to attack by commonly used acids, alkalis or chemicals. Wear resistance is reported two to three times that of steel. Catalog R-655 gives information. Reliance Steel Products Co.

76—CONVEYOR affords automatic-selective transfer

The R-W Twin-Trak Overhead Automatic Dispatch System is reported to provide automatic-selective control over movement of parts to predetermined areas



through the production and storage facilities of an entire plant. Parts may be automatically supplied to each work station, as needed, from individual storage banks or lines, it is stated. Power and free systems are engineered to use component parts that are readily available for expansion or economical maintenance replacements. A Twin-Trak set-up may be combined with company's present R-W Zig-Zag Conveyor Systems to integrate individual conveyors into a plant-wide automatic conveying system. Compact and easily installed, the track curves of this conveyor system may be formed on a radius as small as 2 ft. It is available with manual or electronic selector controls. Richards-Wilcox Mfg. Co.

More information on any of these products can be yours without cost or obligation. Just circle the item numbers on the Reader Service Cards provided on pages 241-242.

77—PAPER TOWELS to fit the popular size dispenser

This new line of paper towels is specifically designed to fit the three towel dispensers commonly found in company washrooms. In this line, the well known ScotTissue Towel, known as a C-fold is joined by two new products, a single-fold and multifold towel to make an

Wherever corrosion-resistant paint is used—

TYGON ATD* Hot Spray PAINT

cuts job costs to the bone!

Using any standard hot spray equipment, Tygon ATD builds a vinyl film 5 mils thick, with just two passes. No thinners are needed. Heat at 160° reduces ATD to spraying consistency. The low solvent content evaporates on atomization, leaving a dense, high solids vinyl film which is quick-drying, smooth and glossy. And it is highly resistant to corrosion.

You'll save up to 20% on materials *and* up to 30% on labor with Tygon ATD Hot Spray Vinyl Paint, so . . .

- Saves up to 20% on material
- Saves up to 30% on labor
- Less overspray—low paint loss
- Faster—5 mils in two coats
- Perfect edge build-up

Get the complete story – Write today for Bulletin ATD-9.

193E

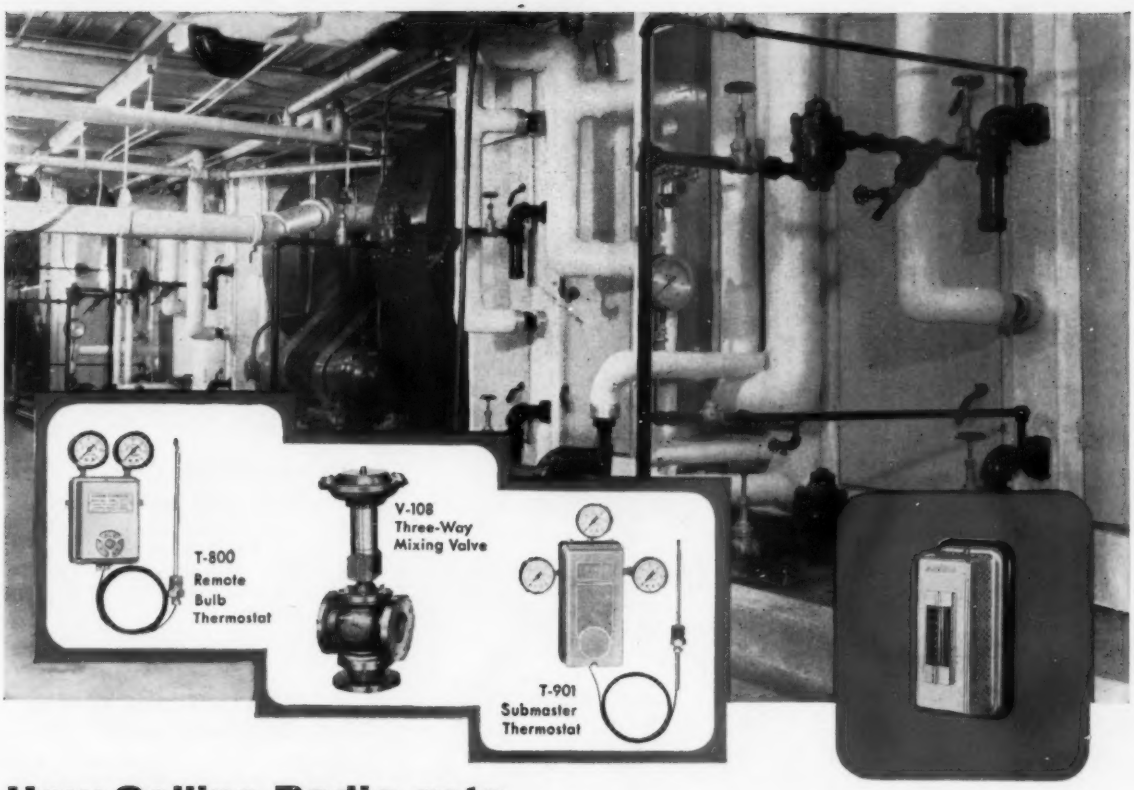
PLASTICS AND SYNTHETICS DIVISION

U. S. STONEWARE

AKRON 9, OHIO

*ADHESION • THICKNESS • DENSITY

For more facts circle 643 on Reply Card



How Collins Radio gets Precision, Waste-Free Air Conditioning Performance

A creative force of over 750 engineers, technicians and supporting staffs occupy the impressive new engineering and research building of Collins Radio Company.* Design, layout and equipment have been skillfully combined to produce a completely controlled environment for each of the varied research and development activities of Collins personnel.

A key feature of this modern controlled environment is a specially designed system of Johnson Air Conditioning Control. Johnson Thermostats, Valves, Dampers and other apparatus regulate the operation of eight central fan air conditioning units and related equipment to meet the special needs of each section of the building. Whether it's one of the large general office areas, a conference room, test area, laboratory, library or the cafeteria-auditorium, ideal temperatures prevail at all times.

By engineering and installing each of its control systems to meet the exact needs of the individual building and its particular mechanical equipment, Johnson offers the dual benefits of perfectly regulated temperatures and virtually waste-free heating and cooling operation.

Johnson Pneumatic Control combines the adaptability, accuracy, and economy to solve *any* problem of heating, cooling, ventilating, air conditioning or process control. Johnson engineers know and understand thoroughly the special control problems of industry.

Whether your problems involve comfort control or the provision of protective temperatures and humidities for products and processes, talk them over with a nearby Johnson engineer. His advice is yours without obligation. Johnson Service Company, Milwaukee 1, Wisconsin. Direct Branch Offices in Principal Cities.

*Engineering and Research Building, Collins Radio Company, Cedar Rapids, Iowa. Abell-Howe Company, architects & builders, Chicago; Samuel R. Lewis & Associates, mechanical engineers, Chicago; J. W. Darragh, Inc., mechanical contractor, Cedar Rapids.

JOHNSON CONTROL
SINCE 1885

PLANNING • MANUFACTURING • INSTALLING

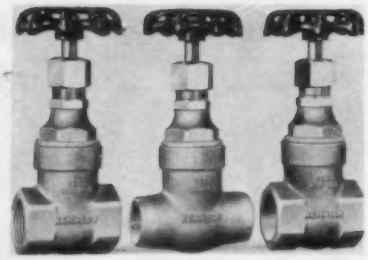
For more facts circle 644 on Reply Card

(Begins on page 156)

industrial towel line available in three price ranges to fit any requirement. Thus, it is possible to obtain this company's towels in the exact size necessary to fit most dispensers already in use. The single-fold towel measures 10 by 10½ in. and the multifold towel, 9⅛x9½ in., each put up in a 250 towel package, with 15 packages per case. The C-fold towel measures 10-7/16 by 14 in. and is put up in a 150 towel carton, with 25 cartons to the case. Features of these towels are said to include proper absorbency, wet strength, adequate stretch, no odor or lint, and economy. Scott Paper Co.

78—GATE VALVES feature cylindrical construction

These 125-lb bronze gate valves for steam, water, oil or gas, are available in screwed, solder joint and brazing socket ends, in sizes from ¼ through 3 in. Accelerated-wear tests are reported to show that the cylindrical construction results in more than 10 times longer leakproof operating life than many types of valves. Other features include pistol-grip handwheel combining a firm, easy three-way grip;



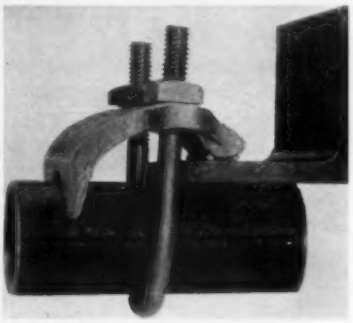
an improved impregnated plastic packing material selected because it maintains resiliency and resists leakage longer; heavy pipe-end hexes; extra weight for durability. Circular 564 gives more information on this line of valves. Kennedy Valve Mfg. Co.

79—STORAGE CABINET to keep tiny parts visible

Only 6½ in. square, the Mighty Midget is molded of high-impact plastic and each of its four see-through drawers divides into three separate compartments to make 12 separate bins if desired. It has rubber tipped feet to prevent scratches. The Campro Sales Co.

80—PIPE, CONDUIT CLAMP has double bite

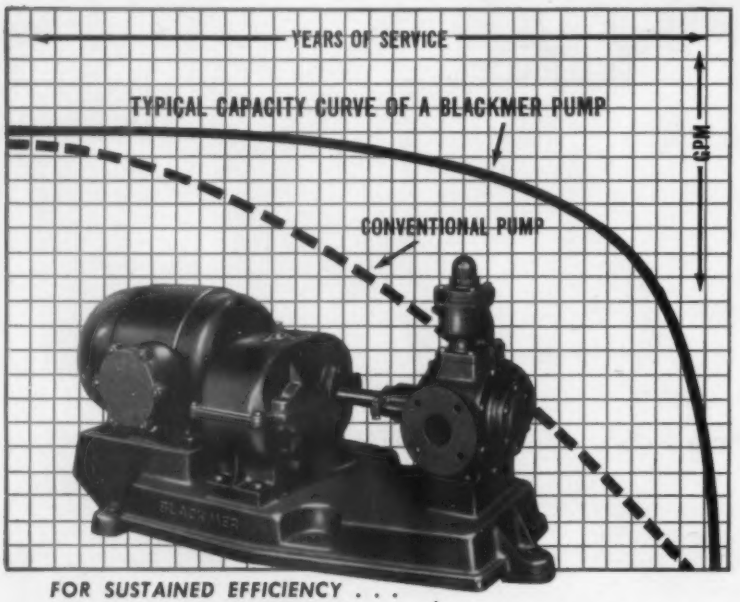
The Latrobe Clamp is made of iron, cadmium plated to prevent rust, and has double bite of case hardened tool steel. The safety bite is V-shape to give a



double bite into the steel frame to which it is attached. Attachment may be made without drilling holes in the frame work. It is made in two models: one for right angle support (illustrated) and one for parallel support, and comes in ten sizes for pipe or conduit from ½ to 4 in. Fullman Mfg. Co.

81—RUST PREVENTIVE BASE miscible with water, oil

Rust Veto M.P. is a multi-purpose rust preventive base for mixing with water, solvent or oil, or using neat. This water displacing rust preventive base is reported to have a wide range of uses for indoor protection. When mixed with water, it provides a safe, non-flammable emulsion with high stability and excellent protection value, manufacturer states; and it is especially economical when mixed with



FOR SUSTAINED EFFICIENCY . . .

BLACKMER rotary pumps are self-adjusting for wear

The vane construction of Blackmer Rotary pumps provides for automatic "take-up" to maintain high capacity throughout the life of the pump. Positive displacement design gives full-rated, smooth flow delivery. Replaceable wearing parts make it possible to restore "new pump" efficiency after years of service at minimum cost.

Blackmer pumps are successfully handling a wide range of liquids and semi-solids in practically every type of industry.

Capacities from 5 to 1500 gpm., pressures to 150 psi, temperatures of liquids to 600° F, weather-proof construction, gear reducers and a wide range of power units for electric, gasoline or diesel power are available to meet your needs.

SPECIFY BLACKMER PUMPS — NO OTHER GIVES YOU MORE

BLACKMER PUMPS liquid materials handling ®

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INDUSTRIAL, HAND AND TRUCK PUMPS, STRAINERS, PRESSURE CONTROL VALVES

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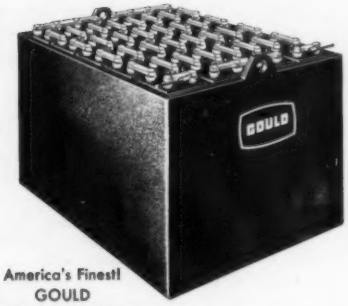
"There's Nothing Platonic About My Love for *gould* Batteries"



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Industrial Truck Batteries

Anyone can become really fond of something that cuts costs year after year. That's why we have so many Gould enthusiasts. Gould battery power is the lowest cost power on the market. Why not cut your costs with Gould Research-Built Battery Power.
Gould-National Batteries, Inc., Trenton 7, N. J.

Always Use Gould-National Automobile and Truck Batteries

gould
BATTERIES

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For more facts circle 646 on Reply Card

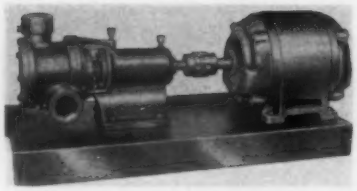
NEW PRODUCTS

(Begins on page 156)

water. Data Sheet 2-459 gives physical properties. E. F. Houghton & Co.

82—PROCESS PUMPS for light non-viscous liquids

Turbine-type single and double stage process pumps in the series APCO-Z4 are intended for handling liquefied petroleum gases, refrigerants and other light non-viscous liquids. The pumps are available in any machinable alloy such



as nickel, Monel, stainless steel. They operate at low suction head requirements to assure a positive, non-pulsating flow. There is claimed to be no shaft leakage because minimum pressure is exerted against the mechanical seal through the use of built-in pressure relief. Balance holes on both sides of the impellers equalize pressures in single-stage pumps to provide balanced hydraulic loads. Impeller loads of two-stage pumps are balanced radially by opposing pressures between stages. Aurora Pump Div., The New York Air Brake Co.

83—MERCURY LAMPS of higher beam candlepower

Two recently introduced types of 400-w mercury weatherproof reflector lamps are announced as offering a much higher beam candlepower than other 400-w mercury lamps. The new lamps include the Merco-Flood (R60-H1/FL) a mogul-based floodlight with frosted face, and the

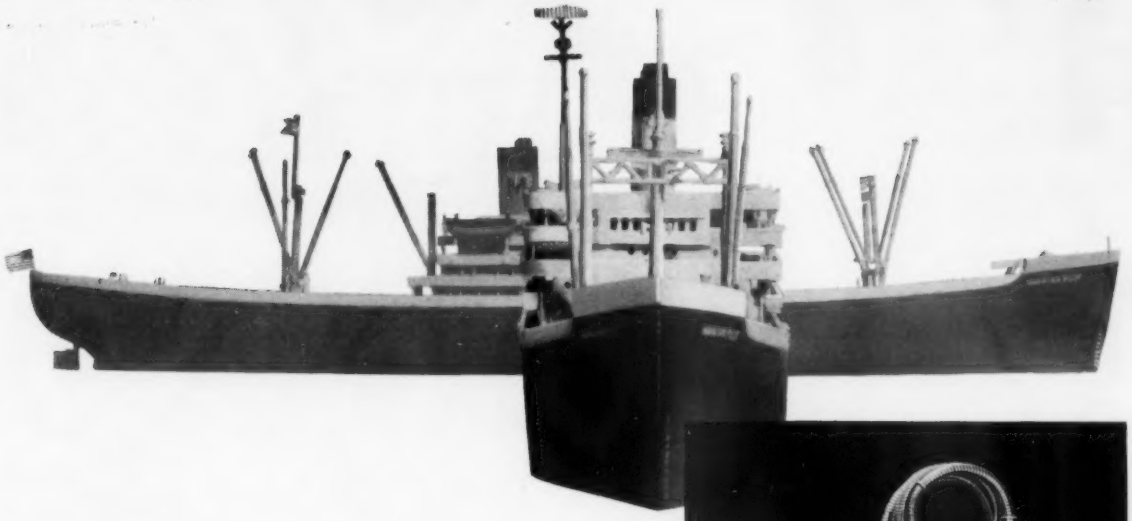
Merco-Spot (R60-H1/SP, illustrated), a mogul-based narrow beam spotlight with a clear face. Both types use hard glass weatherproof envelopes with silver reflectors. Company says they can be used indoors or outdoors without enclosed fixtures. They are designed to furnish maximum directed illuminations and can be used as replacements for other 400-w H1 types without transformer change. Radiant Lamp Corp.

84—PNEUMATIC COMPUTER measures pressures ratios

The Model PR-O Computer is a pneumatic pressure-ratio computer designed to measure compressor inlet and outlet pressures and simultaneously calculate the ratio of these two pressures. Outstanding features announced for it are wide range, flexibility, accuracy and pneumatic signal transmission. Pressure ratio is a key variable which must be regulated in order to prevent flow instability or surge in exhauster, compressor or blower control systems. The instrument indicates pressure-ratio on an integral scale and generates a pneumatic signal proportional to pressure-ratio for use in a control system. It can be used in other applications requiring the calculation of the ratio of two pressures.

The computer is available for application in ranges of static pressures of from 0 to 10 psig up to 0 to 400 psig. Higher static pressure ranges may be had. Available for computing on a gage or absolute pressure basis, the Model PR-O can also be supplied with a zero base or suppressed scale indication. Ratio calculating accuracy of the computer is

For more facts circle 647 on Reply Card



WON ITS SEA LEGS ...DECADES AGO!

When the windjammer bowed to King Steam and trans-oceanic travel gained reliable power, the Atlas line was already an industrial standard. Year followed year of consistent top performance, and today—three decades after the first Atlas went to sea—tens of thousands of regulators have logged time aboard vessels 'round the world. Each Atlas automatic pressure, temperature and level regulator is proof anew that Atlas stands for dependability and performance, for the answer to all requirements of shipboard service.

Full details available in Atlas' new condensed catalog 56C.

AUTOMATIC
PRESSURE
TEMPERATURE
AND LEVEL
CONTROLS

ATLAS VALVE COMPANY 280 South St. Newark 5, New Jersey

Representatives in principle cities of U.S. and Canada

For more facts circle 648 on Reply Card

Ask these questions, too, when you judge a fluorescent lamp...

Is your investment protected?

Check Westinghouse Fluorescent Lamps against any other brands you are now using. Check them for maintained brightness, long life, uniform appearance. If you are not entirely satisfied on all counts, your full purchase price will be refunded.

Is it built for good "lumen maintenance"?

Made exclusively with deterioration-resistant Halo Phosphors, Westinghouse fluorescent lamps *maintain* high light output to the end of their long lives.

Is it the correct type, size and color for the lighting job to be done?

In the Westinghouse fluorescent family of 290 different lamps—including Slimline and Rapid Start—there's a type and size precisely right for every office, plant and merchandising application. Colors include seven different shades of "white" alone.

For the full story on how to get more for your money in fluorescent light, contact your Westinghouse Lamp Representative.

WATCH WESTINGHOUSE

WHERE BIG THINGS ARE HAPPENING FOR YOU!

For more facts circle 649 on Reply Card

NEW PRODUCTS

(Begins on page 156)

claimed high even when the input static pressure turndown ranges are as great as 30 to 1. Bulletin MSP-103B gives information. Hagan Corp.

85—POWER TAKE-OFF is high capacity unit

Recently added to this company's SP line of heavy duty friction power take-offs is the Model SP-321, described as unusually compact for its high capacity. It is designed to handle up to 6730 lb-ft of torque and transmit up to 602 hp at

1550 rpm. It is available with a standard SAE No. 00 flywheel housing adapter to meet the widest range of industrial power units in its horsepower and rpm ratings. Other features announced include a triple driving-plate construction to provide ample friction surfaces to withstand excessive heat; a pilot bearing with double-width bearing race for greater lubrication retention and long life; and a spherical roller bearing at the clutch output shaft for greater overload and side-pull capacity. The Twin Disc Clutch Co.

86—SOLENOID VALVE with in-line construction

"In-line" construction of this two-way direct solenoid controlled valve facilitates inspection and servicing. All control

parts can be removed in one small assembly, without disturbing piping, by loosening one hexagonal nut. Primarily for a-c applications (both pressure and vacuum) this normally closed valve is available in standard pipe sizes from ¼ through 2 in. Having only two moving parts, it assures a positive, high-speed action with short plunger travel, company notes, and it can be controlled by a relay or a micro-switch. Manufacturer says it can be mounted in any position and operated continuously without harm to valve or solenoid. Airmatic Valve, Inc.

87—HYDRAULIC PUMP for use with rams

The No. 798 GM is announced as a powerful, lightweight, gasoline operated hydraulic pump for use with all of company's Simplex Re-Mo-Trol Hydraulic Rams. With a displacement of 30 cu in. of oil per minute, this power pump is designed to raise a ram five times faster than a hand pump with a displacement of 6 cu in. of oil per minute. The new pump unit has a 1½ hp gasoline engine to provide continuous operating pressure of 5000 psi and intermittent pressure to 10,000 psi. When used with the rams, the No. 798 GM provides combination units with capacities from 10 to 600 tons for lifting and moving heavy loads. The set-up exerts lifting, pushing or pulling force in any direction while the operator remains a safe distance away. Details are in Bulletin Hydraulic 56. Templeton, Kenly & Co.

88—STACKING BIN speeds handling of small parts

Model 900-D Bin has reinforced corners, drop handle in back and spotwelded construction, with four rivets for extra

strength. Its continuous stacking rim on all four sides stacks with company's 800-D Stacking Box of the same length and width. Bay Products, Inc.

89—SEALED SWITCH is high capacity unit

This sealed, roller plunger switch, the No. BAFI-2RQN8, is designed to handle inrush currents up to 75 amp. Manufacturer explains that the switch is made oil-tight by integral O-rings around the bushing and plunger and a ring-type seal between the cover and the housing. Other features announced include an actuator that is field adjustable through 360 deg to allow operation from any direction; a rugged, corrosion-resistant steel roller, and a heavy plunger bushing. Although enclosure is compact, ample wiring space and side facing screw terminals allow

how to judge a fluorescent lamp . . . point no. 7

ask about **QUALITY CONTROL**

You would never guess it from their price, but fluorescent lamps today are *precision* products. (In Westinghouse fluorescent lamps, for example, you'll find mercury measured with the precision of a doctor's prescription, electrodes wound with fine-watch accuracy.) Thus only the closest quality control can give you the high light output, the long life, the good color qualities you expect from every single lamp you buy. Westinghouse quality control includes *480 inspections and tests* for every lamp produced.

WATCH WESTINGHOUSE

*WHERE **BIG** THINGS ARE HAPPENING FOR **YOU!***

For more facts circle 650 on Reply Card

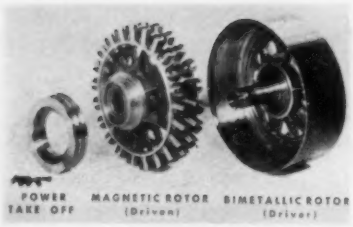
(Begins on page 156)

easy installation. The aluminum enclosure protects switching unit from physical damage and also provides a means for mounting and for conduit connection. The switch is available with actuator positioned either to right or left. Contact arrangement is single-pole, double throw. The switch is UL listed at 20 amp 125, 250 or 460 v a-c; ½ amp 125 v d-c 2 hp 230 v ac; 10 amp 125 v when controlling tungsten filament lamp loads on a-c circuits. Micro Switch, Div., Minneapolis-Honeywell Regulator Co.

90—MAGNETIC DRIVE is efficient, compact

The Whitney-Tormag Magnetic Drive provides a flexible slip-type drive between motor and load, in a range from fractional to over 50 hp. Its cylindrical design, adaptable to new, smaller NEMA frame specifications, is said to permit the Whitney-Tormag unit to be smaller in diameter than an electric motor of similar horsepower. The drive consists of: a magnetic rotor (a cylinder with Alnico magnets attached), and a bimetallic rotor (copper-faced mild steel plate or cylinder perforated with steel rivets).

These rotors are mounted face-to-face with an air space between them. If either



is driven, a torque is induced in the other through eddy currents with the magnets supplying necessary magnetic flux. It is stressed that driving and driven rotors are never in contact. Advantages announced include freedom from shock and vibration; smooth pickup for heavy, unbalanced or fluctuating loads; high efficiency at rated horsepower; ability to withstand exterior temperatures from –60 to 250 F. The drive is fully reversible, may be used as a dynamic brake, states manufacturer; and motors are powered to actual running requirements.

An outstanding feature of the drive is overload protection provided for the driving motor. The drive can be run in full stall indefinitely without harming motor or magnetic drive, it is claimed. In stalled position all of input horsepower appears as heat, appearing in the bimetallic rotor only. Construction features are designed to assure a safe, precalculated heat equilibrium point—about 5 min of running at full load will reduce drive temperature to normal. The design of the new drive is said to permit variations to cover a wide range of transmission problems involving synchronous drives, variable speed-variable torque output, or variable speed-constant torque output applications. Whitney Chain Co.

91—CARD HOLDER KIT for electrical circuit identification

This low cost identification card holder kit provides neat, legible identification of electrical circuits. It is available for

switches, enclosed circuit breakers, switchboard circuits, panelboards and load centers. According to company, installation takes only a few minutes. Two small holes are drilled and the holder is anchored firmly to device with two self-tapping screws. Ten card holder assemblies, each packaged individually, are included in each kit. Square D Co.

FIND OUT HOW
GARDEN CITY FANS
Cut Maintenance Costs

Heavy Duty
Material Handling Wheel

Anybody can claim lower maintenance costs . . . but only sound facts that make sense can prove it:

In the movement of material by air, the design and construction of the fan blade becomes very important. That's why Garden City's *heavy gauge*, heavy duty steel blades pay off in lower maintenance costs. They are also highly resistant to abrasion and corrosion.

Bearings are another frequent troublemaker in some fans. But Garden City's air cooled shafts on their Heat Fans increases bearing life. Therefore, they remain maintenance-free longer.

Garden City has been a leader in the industrial fan field for over 75 years.

Non Overloading
Backward Curve Wheel

WRITE TODAY for free brochure giving full information.

GARDEN CITY FAN COMPANY
ESTABLISHED 1879

332 S. Michigan Ave.
Chicago 4, Illinois
Dept. B

Representatives in Principal Cities

• Fans for Industry • Backward Curve • Forward Curve
• Material Handling • Radial Bladed • Small Exhaust

For more facts circle 651 on Reply Card

Maytag switches to STANICOOL HD *Soluble Oil— makes two-way saving*

1 ***Cost of soluble oil reduced***

2 ***Soluble oil consumption cut two-thirds***

A 300 ton Verson press at the Maytag plant, Newton, Iowa, is used for piercing holes in the inner tubs of Maytag's fine automatic washers. Material used is 18 gauge enameling iron. Holes are pierced in six automatic cycles. A total of 936–3/16 inch holes and 6–19/32 inch holes are incised in each tub.

A check of manufacturing costs on the tubs disclosed that the cost of soluble oil per unit produced was too high. Standard Oil lubrication specialist J. I. Nelson, working with plant management suggested a switch to STANICOOL HD Soluble Oil. The switch was made and Maytag received the first part of its two-way saving: the cost of soluble oil per gallon was reduced. Then it was found that the same high quality product could be turned out, without loss of tool life, while spraying only every third tub. Formerly *each* tub was sprayed with soluble oil before punching. With STANICOOL HD, soluble oil consumption was reduced two thirds. And thus, Maytag received part two of its two-way saving.

Perhaps STANICOOL HD Soluble Oil can help you make similar savings. Find out. Call your nearby Standard Oil office in any of the Midwest or Rocky Mountain states. Or write Standard Oil Company, 910 South Michigan Avenue, Chicago 80, Illinois.

Dwight Norton (right) a Maytag plant foreman inspects automatic washer inner tub with Jesse I. Nelson, Standard Oil lubrication specialist. Jesse Nelson is well qualified to provide lubrication technical service. He has a B.S. degree in engineering from the University of Iowa and has completed the Standard Oil Sales Engineering School. Jesse has been helping customers with lubrication problems for more than three years. Customers find his experience and training pay off *for them.*

STANDARD

STANDARD OIL COMPANY
(Indiana)

For more facts circle 652 on Reply Card

Quick facts about

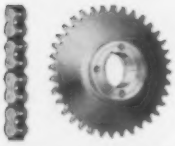
STANICOOL HD Soluble Oil

- **Emulsifies readily with all waters.**
- **Forms stable, uniform emulsion.**
- **Does not turn rancid.**
- **Non-injurious to men, machines and work.**
- **Economical. Meets work requirements with relatively low emulsion concentrations.**
- **Prevents rusting of work and machines.**
- **Gives better tool life.**
- **Doesn't form gum on machines.**

DODGE PRODUCTS
you should know

TAPER-LOCK
ALL STEEL
CONVEYOR PULLEYS

TAPER-LOCK
SHEAVES



TAPER-LOCK
SPROCKETS AND
DODGE ROLLER CHAIN

DODGE BULLETINS
YOU SHOULD HAVE

1 TAPER-LOCK STEEL CONVEYOR PULLEYS. Construction details, sizes, dimensions. Bulletin D56.

1 TAPER-LOCK Sprockets, Chain Couplings and Dodge Roller Chain. Technical information—selection, installation and maintenance data. Bulletin A-644.

Write for your copies.

DODGE MANUFACTURING CORPORATION
2700 Union Street • Mishawaka, Indiana

DODGE
of Mishawaka, Ind.

For more facts circle 653 on Reply Card

Industrial Fire Department

(Continued from page 97)

Caution should always be employed when walking past windows.

The center of the floor in most buildings is the weakest part of the flooring.

Oxygen can be obtained by holding the head close to the stream by the nozzle.

In escaping from a smoke filled room or building, a hose rope tool can be used to secure a charged hose if nozzle has no shut-off and if conditions hamper vision, you can escape by following hose line to an exit.

Fog nozzles are good at smoky fires as broken particles of water absorb gas and heat and the water curtain has a tendency to push smoke ahead of it as you advance.

These and many other safety methods are discussed at our drills which are held indoors in the winter months.

We realize that the threat of fire is with us constantly and that it seldom gives a warning. Eternal vigilance and preparedness are industry's best defense.

Case for the Industrial Park

(Continued from page 111)

up to accommodate certain industries all of those accepted in a park would be entitled to equal services. The only exception would be that locations in a park would be granted on a "first come, first served" basis.

Rental costs would include road and street maintenance, landscaping and upkeep, and exterior cleaning of buildings. Repairs would be taken care of by the management when they were in the category of normal wear and tear. Assurance of high standards would be guaranteed in the areas of maintenance and selection of tenants.

While medical and recreational centers are not, in most instances, furnished as a matter of course they could be if tenants desired to maintain the cost of such facilities jointly.

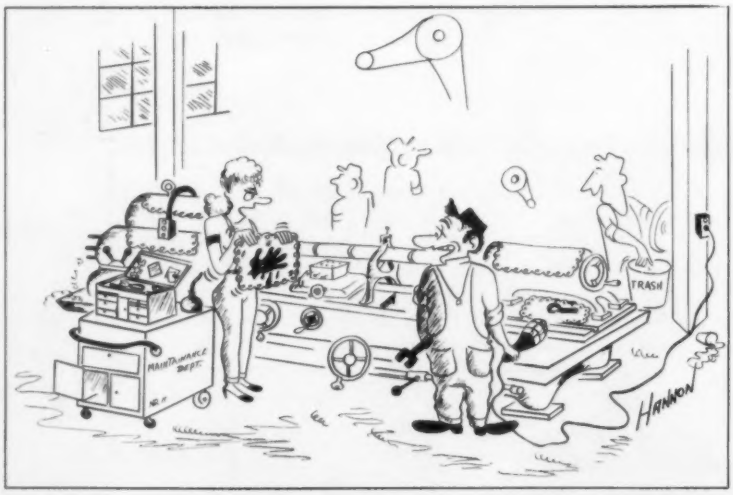
One inducement which makes location in industrial parks particularly attractive is the availability of complete shipping facilities, including around-the-clock railroad switching service. Another is the cheapness of extra facilities which might be desired, such as the above-mentioned recreational and medical facilities whose costs could be borne jointly, costs which would be prohibitive for an individual plant to bear.

DRY Compressed Air

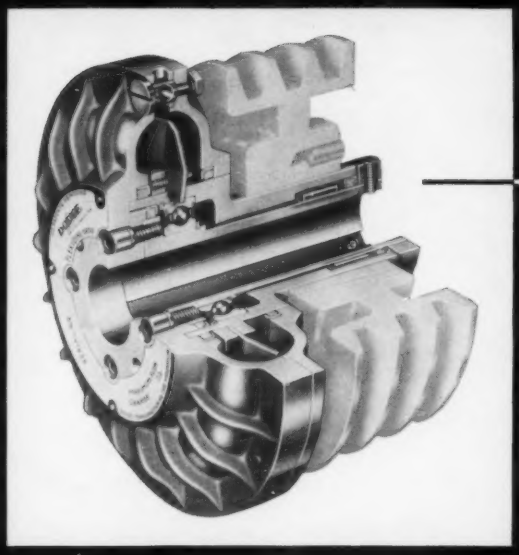
(Continued from page 114)

fire protection regardless of freezing temperatures, have recently been found to be completely inoperative in several cold storage plants. Moisture in the compressed air fed to the sprinkler supply lines had frozen solid where the pipes enter the below-zero cold rooms. Working backwards to the power plant, propylene glycol was pumped through one supply line after another. It took a full year to complete the task, but every pipe was freed of ice and rust. Now a small drier dries the compressed air to a dewpoint of —40 F, so there'll be no more condensation to cause trouble.

How a Drier Works: Heating air does not dry it; this simply increases the air's ability to carry more moisture, lowering its relative humidity. As shown in the opening paragraphs, a separator removes only the water which an aftercooler has caused to condense. Adsorbent driers will catch the *vaporous* moisture, reducing the



"Doilies? . . . I was wondering where such flimsy handtowels came from!"



Great Performance!

– is the verdict from the field on

FLEXIDYNE

THE DRY FLUID DRIVE

Experience in the field proves that the new principle employed in Flexidyne provides a better way to handle difficult drive problems. Now delivered from stock, Flexidyne Drives and Couplings are used in a wide variety of applications. Already reports like these are coming in about Flexidyne performances in many tough assignments:

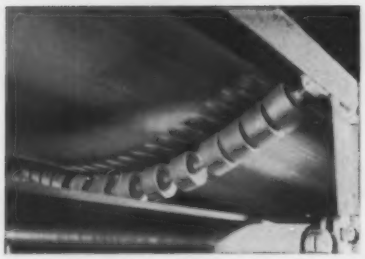
RAILROAD CAR PULLERS... *"Starts fine . . summer or winter!"*
CONVEYORS... *"We start under full load now!"*
COTTON CARDS... *"Finally . . the soft start!"*
TRAVELING CRANES... *"Spots our load . . and how!"*
PUMPS... *"Now we are using smaller motors, too!"*
VENTILATING FANS... *"Takes off smooth as silk!"*
...AND OTHER HEAVY INERTIA LOADS... *"Wonderful performance!"*

Call the Transmissioneer, your local Dodge Distributor, for details about Flexidyne. Factory-trained by Dodge, he can give you valuable assistance on new, cost-saving methods. Look for his name under "Power Transmission Machinery" in your classified telephone directory, or write to

DODGE MANUFACTURING CORPORATION, 2700 Union Street, Mishawaka, Indiana

DODGE
of Mishawaka, Ind.

For more facts circle 654 on Reply Card



NEW CONVEYOR BELT IDLER

Handles sticky, abrasive, dusty, or corrosive materials.
Has only two bearings—up out of the dirt.

A 2-bearing, cable suspension idler that resists dust, abrasion, corrosion and material buildup is proving itself superior for bulk handling in many industries.

Called the Limberoller, it has already given *10 times* the service life of replaced steel idlers in handling abrasive foundry sands, coal, petroleum coke, potash, copper ores, copper mill tailings, iron ore, wet concrete, triple super phosphate, ammonium sulphate, and sticky fertilizers.

Pressure-molded neoprene or rubber discs on a flexible steel cable conform to load and cushion the belt, help keep belt aligned, and are self-cleaning. The two bearings are up out of the dirt zone; have had no design failures.

Unaffected by most corrosives that damage steel, the new idler is ideal for chemical, sulphur and salt plants; corrosive and high ozone atmospheres. It is more abrasive-resistant than steel and flexes out of the way of abrasive materials.

The Limberoller weighs 2/3 less than a conventional steel idler; is locked by a simple cotter key into special lightweight stands for easy installation and removal. No cover sheets are needed. Two types of stands are available: one that bolts to conventional rigid sections; and a self-supporting type that forms its own easily-erected, portable sections without bolts, by using special stiffening rails.

Because of these unique features, many companies have adopted Limberollers as standard for all belt conveyor operations. Details from *Joy Mfg. Co., Oliver Bldg., Pittsburgh 22, Pa. Request Bulletin 24-15.*

For more facts circle 655 on Reply Card

dewpoint as low as —100 F if desirable.

These driers are filled with dessicants which have a high affinity for water. They attract and hold the moisture until it is driven off by heating—and without physical or chemical change, so the process can be repeated theoretically forever. Duplicate towers containing the dessicant permit one to be doing its drying while the other is being regenerated. The cycle is reversed manually or automatically, but without interruption or dropping off in efficiency. A dependable drier will assure you of constant dryness the year around, regardless of weather conditions.

Heat Exchanger Tube Sampling

(Continued from page 123)

roded external tube surface which shows no defects. Immediately below is shown the heavily corroded inner tube surface after cleaning.

Notice the wall thinness at several points along the cut edge. If this condition were known before failure, the tube bundle would not have been returned to service after pressure testing. Just below the cleaned section of tube is shown the other half of the split tube before cleaning. Loss of wall thickness can be detected along the cut edge before cleaning. Tubercular deposits cover small corroded areas with knob-like lumps and severely reduce heat transfer efficiency.

The split return bend of the tube is shown at the bottom of Fig. 2. Although no marked decrease in wall thickness can be seen at the saw cut, much corrosion is evident. Fluid velocity was low and did not in this case erode the heel of the return elbow.

In this particular inspection, local corrosion rather than overall uniform loss of metal was discovered.

When examining a tube in the manner stated, the question may arise as to whether this one tube is representative of the bundle.

If the test tube selected was the thickest one in the bundle, a decision to retube is obviously correct since the other tubes will be in even worse condition. If the tube selected was the thinnest one in the bundle, a decision to retube may be correct to avoid product loss or contamination. In either case, a far more accurate estimate of the condition of your heat exchanger has been made than by previous methods. In services where tube bundles *must* be removed before they fail (as in radioactive service) the test tube method may actually extend the useful life of the tube bundle, if examination reveals that tube bundle is in better condition than assumed.

"Airco's complete line of stainless steel electrodes simplifies my buying job"

Airco provides me with a stainless steel electrode with a deposit to match the base metal of the item to be welded. The Airco AC-DC stainless electrode is generally preferred in my shops where only one type of coating is stocked. The AC-DC coated electrodes have the most operator appeal because of the smooth arc action, exceptional bead appearance and very easy slag removal.

Stainless steel electrodes are but one of many types in Airco's complete line that also includes hard-facing, cast iron, mild steel, general and special purpose electrodes. Send for the free Airco Electrode Guide which will help you select the right electrode for your specific job. Request catalog 1318-PE.

AIRCO
AIR REDUCTION
New York 17, N. Y.
Offices and dealers in most principal cities
On the west coast—
Air Reduction Pacific Company
Internationally—
Airco Company International
In Cuba—
Cuban Air Products Corporation
In Canada—
Air Reduction Canada Limited

For more facts circle 656 on Reply Card

GIANT-SIZE PROTECTION

Cranes, conveyors, bridges, storage tanks—the giants of industry can be protected economically with Barrett Cold Coatings. These high-grade coal-tar coatings offer outstanding resistance to moisture and chemical atmospheres. Their long service life and low applied cost per coat thickness can net a substantial reduction in plant maintenance cost. They can be applied quickly and simply by brush or spray to metal, masonry and wood surfaces. No heating or activation required. No special techniques or skills needed by applicators . . . priced for economy.

You get peak protection at lowest cost with Barrett Cold Coatings. Barrett will be glad to show you how. Write for particulars, prices, literature.

Barrett®

PROTECTIVE COATINGS

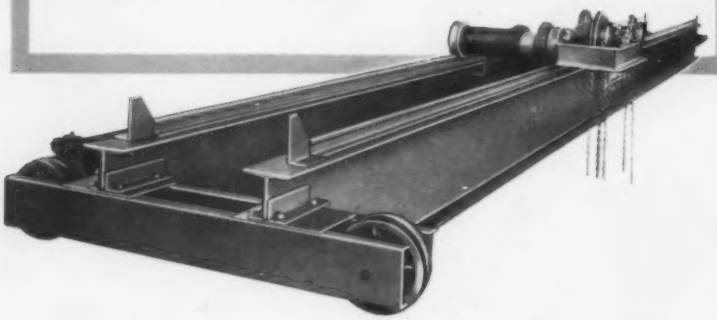
BARRETT DIVISION, Allied Chemical & Dye Corporation, 40 Rector Street, New York 6, N. Y. In Canada: The Barrett Co., Ltd., 5551 St. Hubert Street, Montreal, Que.

Allied Chemical

OVER 100 YEARS OF EXPERIENCE

For more facts circle 657 on Reply Card

For Low-cost, efficient stand-by service . . . choose a 'Load Lifter' Hand Operated Crane



Type "BR" 'Load Lifter' Hand Operated Cranes are widely favored for intermittent and stand-by service because of features like these:

TWO SPEEDS: First, a safe speed for handling heavy loads. Second, a time-saving speed twice as fast for handling light loads or lifting and lowering the hook without load.

EFFICIENCY: The type of gearing used converts every possible ounce of muscle effort into useful work.

SMOOTH OPERATION: Maximum use is made of roller bearings. The big, grooved drum takes the full run of wire rope without overlapping.

MAXIMUM SAFETY: Double girder construction provides rugged strength. Automatic load brake acts fast — holds the load safely — lowering is always under perfect control. No tail chains hang down to foul the load. Operating chains are as far as possible from the load.

LOW MAINTENANCE: Built of the finest materials, with design and workmanship of the same high quality as the most expensive heavy-duty cranes we manufacture.

If you want the convenience of a reliable, long-life crane for occasional lifting and moving jobs, investigate the Type "BR" 'Load Lifter' Hand Operated Cranes. Capacities: 3 to 50 tons. Lifts: 28 to 37½ feet. Spans: 15 to 60 feet. *Ask your "Shaw-Box" Distributor for details or write for Catalog 218C.*

MANNING MAXWELL & MOORE INC. TRADE MARK

'Load Lifter'® HAND OPERATED CRANES

MANNING, MAXWELL & MOORE, INC.

MUSKEGON, MICHIGAN

Builders of "SHAW-BOX" and 'LOAD LIFTER' Cranes, 'BUDGIT' and 'LOAD LIFTER' Hoists and other lifting specialties. Makers of 'ASHCROFT' Gauges, 'HANCOCK' Valves, 'CONSOLIDATED' Safety and Relief Valves, 'AMERICAN' and 'AMERICAN-MICROSEN' Industrial Instruments, and Aircraft Products.

For more facts circle 658 on Reply Card

New Plant Construction

(Continued from page 146)

for the purpose in 1952. Construction will begin early in 1957 on an office building, a basic research laboratory, a service laboratory and a central utilities building. Structures will be three or four stories high with exterior walls of brick, glass and stainless steel with a total floor area of 400,000 sq ft. Cost of this venture will exceed $10 million.

Bellefontaine, O.—Delta Power Tool Division of the Rockwell Manufacturing Co., 662 N. Lexington Ave., Pittsburgh, Pa., has announced that it has an expansion program under way at its Delta Power Tool Division, to increase manufacturing facilities by more than 70 per cent. New plant addition will be added to present facility to provide an additional manufacturing area of 144,000 sq ft, at a reported cost approximating $1 million.

Cleveland, O.—The Standard Oil Co. of Ohio, Midland Building, Cleveland, O., has approved plans for the construction of a new modern alkylation unit at company's No. 1 refinery, here. Plant will be capable of converting butane feed stock available at Cleveland into high octane alkylate, for use in the manufacture of aviation gasoline. The unit will represent an expenditure of $3.7 million.

Lorain, O.—The Ford Motor Co., Ford Division, 3000 Schaefer Rd., Dearborn, Mich., has plans under way for the construction of company's sixth new assembly plant for Ford automobiles and trucks, since 1947. Plant of more than 1,500,000 sq ft will be located on a 250-acre site on Lake Erie, three and a half miles west of here. Plant will be equipped for separate assembly systems for cars and trucks.

Canonsburg, Pa.—Vitro Rare Metals Co., a division of the Vitro Corp. of America, Corliss Station, Pittsburgh, Pa., has plans under way for the expansion of its commercial primary uranium processing plant at local site. New addition will double size of existing plant and will permit technical and reagent grade chemical production, and milling and processing of uranium, particularly the residues. Work will begin at once for completion in early 1957. Cost reported to be in excess of $1 million.

Pittsburgh, Pa.—The Westinghouse Electric Corp., Pittsburgh 30, Pa., has announced a major expansion and improvement program of manufacturing facilities at its East Pittsburgh plant. The Transportation and Generator Divisions of the plant will be expanded as two projects. The first project, with work already under way, calls for new equipment and facilities for steel mill customers. The second project will provide additional capacity for the production of large generators for electric utility customers. Cost of both projects will exceed $1 million.

NEW BOOKS

for the plant engineer

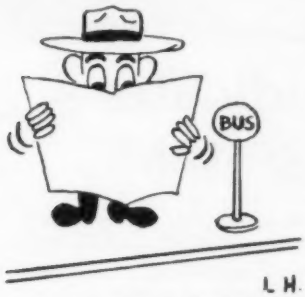
On Electronics

ELECTRONICS IN INDUSTRY by G. M. Chute. Size 9¼ by 6¼ in.; 431 pp including index; illustrated; cloth bound. Published by McGraw-Hill Book Co., Inc., 330 West 42nd St., New York 36, N. Y. Price $7.50.

THIS BOOK INCLUDES basic material on electronics; the information could be considered supplementary to that found in other publications. The material could also serve as an incentive and foundation for further study.

Mathematics is used sparingly in the book and is limited to ordinary arithmetic. In the contents is included information on use of electronic devices in practical circuits. No attention is given to communication circuits as such, but these are treated if they have a bearing on industrial applications. Coverage of recent designs of industrial controls is included and resistance welding controls' material is more extensive.

Some of the many topics of discussion in this book are as follows: simple rectifiers; control of electron



flow in a tube; multigrid vacuum tubes; gas tubes; thyratron tubes; heating and light dimming controls; simple speed and voltage regulators; temperature recorders; closed loop systems—servomechanisms; electronic service instruments; and non-electric devices.

Technical Bibliography

AUTOMATION AND ELECTRONICS. Size 8½ by 5½ in.; 26 pp; paper bound. Published by Management Research Service, 1342 Cherry St., Kalamazoo, Michigan. Price $1.00.

THIS IS, REPORTEDLY, the only available guide to outstanding case studies in the plant and office. It contains reading references to ideas and practices in automation which have worked successfully.

The booklet covers more than 200 outstanding case studies contained in books, conference proceedings, and important periodicals in the fields of automation, electronics and general management. Standard indexing services do not list 70 per cent of these case studies.

To assure maximum usefulness, this booklet is organized, according to important aspects of the subject of automation, and also to major industry. Alphabetical index of companies has been included to facilitate the location of references to particular companies.

Atomic Research

ATOMIC ENERGY RESEARCH at Harwell by K.E.B. Jay. 1955 edition; size 8¾ by 5¾ in.; 144 pp; illustrated; cloth bound. Published by the Philosophical Library, Inc., 15 East 40th St., New York City. Price $4.75.

STORY OF THE ATOMIC ENERGY research establishment appears in this book from the United Kingdom Atomic Energy Authority. It takes up the coverage from the point at which discussion was left in a previous book (Harwell—the British Atomic Energy Research Establishment) up to August 1954.

In the book is described the work done at Harwell between 1951 and 1954. Changes in the regulation about the release of secret information have made it possible to discuss in more detail some of the subjects which were only mentioned in general terms in the earlier book.

The first major portion of the book, prepared principally for non-technical readers deals with the establishment's major programs. The second main part is more detailed in regards to specific researches. It is slanted to scientific people without previous specialized experience in areas covered.

Standards for Materials

ASTM STANDARDS (1955). Size 9¼ by 6¼ in.; cloth bound; illustrated. Published by the American Society for Testing Materials, 1916 Race St., Philadelphia 3, Pa.

PART 2—NON-FERROUS METALS; 1480 pp approx; price $11.00 non-members. The book contains not only specifications but also presents methods of making tests on various materials. Some of the items given consideration in this publication are as follows: copper and its alloys, zinc, lead, nickel, titanium, metal powders and metal-powder products, electrodeposited metallic coatings, die-cast metals, aluminum, magnesium, and corrosion tests. The book also contains an extensive listing of terms related to metallography.

PART 3—CEMENT, CONCRETE, CERAM-

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You wouldn't buy a new car without at least driving it around the block.

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So vote—but don't vote in the dark in this exciting election year.

Listen to what candidates are saying on TV and radio.

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Talk things out with your neighbors over the back fence and at the filling station on the corner. Take part in the discussion group at your church, club, lodge, or school.

Think about the issues and the candidates—and then make up your own mind. Remember, nobody is in that voting booth but you and your conscience. Step behind that curtain with pride on election day. Then vote as a free American.

VOTER'S CHECKLIST

1. Be sure you're registered.

2. Study the issues and candidates. Go to rallies. Ask questions. Read the papers. Listen to speeches.

3. Mark up a sample ballot in advance. (They are published in the papers.)

4. Join your neighbors at the polls on Election Day November 6th.

Is your name in the book?

You can't vote if you're not registered. You lock yourself out of the polls, unless you're a registered voter. And you and only you can get your name in the Registration Book. When they call the roll on election day, will you be there? Do you know anyone who won't?

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ICS, THERMAL INSULATION, Road Materials, Waterproofing, and Soils; 2017 pp approx; price $13.50 non-members. Among the specifications in this book on different cements, there are those pertaining to slag, natural and masonry types. This information is followed by specifications for gypsum in combination with different materials. The section on brick gives attention to: concrete, sand-lime, and clay or shale brick, chemical-resistant and paving brick. The portion on soils extensively covers methods of testing. PART 5—FUELS, PETROLEUM, AROMATIC HYDROCARBONS and Engine Antifreezes; 1458 pp approx; price $11.00 non-members. This book also deals with specifications but mainly it presents methods of testing for such materials as LP gases, butadiene, motor and aviation fuels, petroleum solvents and naphthas, diesel fuels, industrial oils, lubricating greases, engine antifreeze, and coal and coke.

Production

PRODUCTION CONTROL—Text and Cases by William Voris. Size 9¼ by 6⅛ in.; 413 pp including index; illustrated; cloth bound. Published by Richard D. Irwin, Inc., Homewood, Illinois. Price $7.20.

VARIOUS FACETS of production control for industrial plants are covered in this comprehensive book. It reflects thinking and research of pioneers and leaders in the field of industrial management and control. In the publication is shown the practical application of fundamental theory and principles at specific manufacturing concerns. Even though production control is treated as an integral part of the manufacturing plant, there is emphasis on the interrelationships between production control and the other functions in manufacturing.

Among the 16 chapters in the book are the following: The function of production control and its place in the organizational structure of a manufacturing concern; production control in the small company; visual and mechanical control in manufacturing; and control and the automatic factory —continuous manufacturing.

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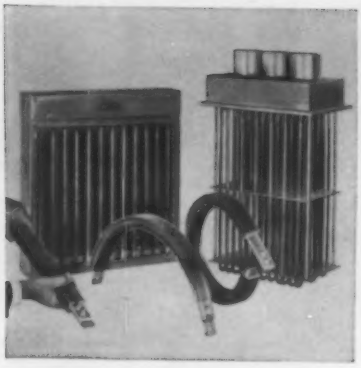

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are the modern, economical answer to your requirements for heating air and gases under forced circulation. Parallel fin design dissipates maximum heat with minimum turbulence of air stream.

Easily installed in round or rectangular ducts. Either manual or automatic thermostat control. Moisture proof types available.

Used in ducts for drying, curing, baking and annealing ovens—there's a heater for any air flow or temperature rise.

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For ideas on additional applications of electric heat, request Booklet F1550—"101 Ways to Apply Electric Heat."

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INDUSTRIAL FILMS

Metal-Working

"Tracer Control in Action" portrays the difficult milling, profiling and engraving operations performed on Gorton tracer-controlled machines. These machines are not restricted by gear-driven constant feeds, nor by longitudinal and transverse lead screws.

This film, photographed under shop conditions, shows applications of the equipment from producing a tiny engraving, to demonstrate precision and sensitivity, to machining work pieces of almost any shape or size to demonstrate versatility.

Such operations as simple 2-dimensional engraving; engraving around a cylinder; profiling irregular ports in large casting; cutter grinding; duplicating from single section master; profiling by automatic operation within the cutting cycle; and precision groove cutting on twin-spindle indexing pantograph are shown.

This is a 16 mm. full-color film

with an explanatory narrative on the sound track. Running time is 36 minutes.

The film is available on free loan basis from George Gorton Machine Co., 1321-II Racine St., Racine, Wis. on letterhead request. User pays return special delivery postage. Three choices should be given as to dates and reservations should be made from 4 to 6 weeks in advance.

Casting Design

Broad fundamentals of the foundry art are presented to the design engineer in a new 35mm color film. It furnishes the engineer with a series of basic design rules in order that he may familiarize himself with the use of cast-to-form metals. The film, which runs for 35 min and is accompanied by a 12-in. 33⅓ rpm long playing record, is available on loan, or for sale, from the Meehanite Metal Corporation, 714 North Ave., New Rochelle, New York.

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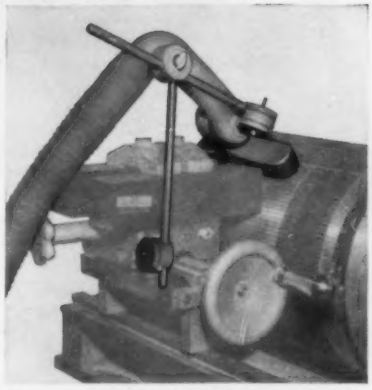

Vacuum attachment picks up metal and stone dust as it is made . . . keeps it out of machine

- **Compact and simple, it does NOT interfere with work in progress.**
- **Fits all IDEAL industrial vacuum cleaner hoses; mounts on grinder or on motor or generator frame.**
- **Cuts clean-up time, prevents bearing trouble and hard-to-locate short circuits.**

Model No. 24-073 is for small commutators; mounts on Ideal's "Midget" Model Grinder or motor or generator frame. Stationary nozzle covers entire commutator.

Model No. 24-074 mounts on Ideal's "Perfect" or "Ideal" Model Grinder, traverses large commutators with the grinder.

Write for more information on these handy attachments. When writing, also ask for IDEAL's informative series of articles on "Commutator and Slip Ring Maintenance."

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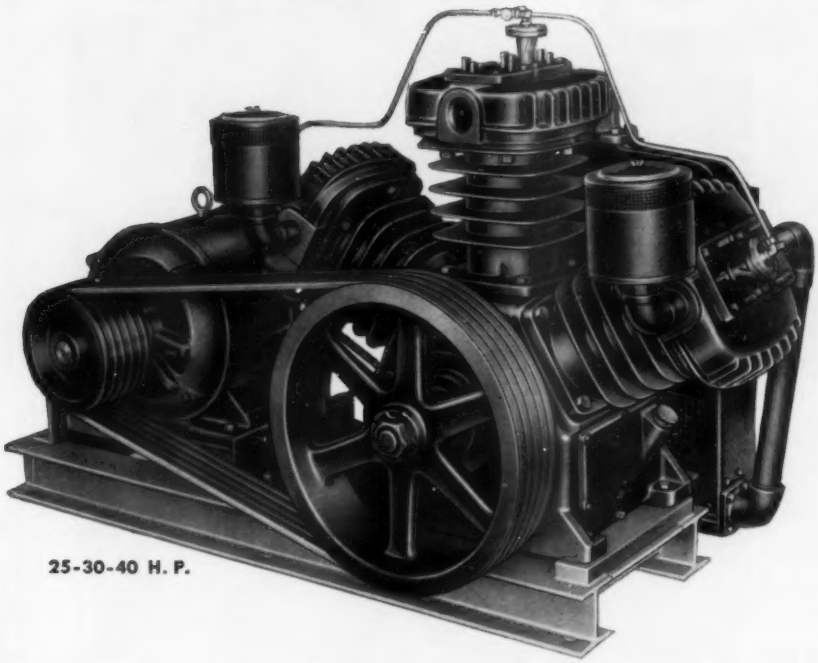
TWO-STAGE, AIR-COOLED AIR COMPRESSOR

Provides Higher Operating Efficiency
Costs Less to Install



25-30-40 H. P.

THIS NEW Curtis Two-Stage will deliver more air per minute, per horsepower and per kilowatt hour of electrical energy consumed, thus assuring a saving in your electrical bill.

It's Air Cooled, thereby eliminating expensive water bills and assuring quick and easy installation with no complicated plumbing problems.

The new C-100 embodies all the well-known Curtis engineering features such as centro-ring oiling and Timken Main Bearings.

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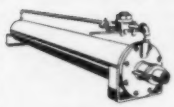

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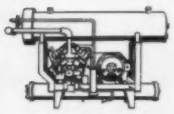

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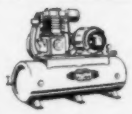

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FUEL SAVINGS: Generally, ten percent or more. This alone means write-off is possible in approximately three years.

INCREASED BOILER OUTPUT: Preheated air makes higher combustion temperatures, which means higher steam producing capacity.

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EFFICIENT USE OF EVEN LOWER GRADE FUELS: Higher furnace temperatures allow effective burning of low grades.

Find out how the efficient, low-cost Package Ljungstrom Air Preheater can be applied to your steam-generating units. Write today to the Air Preheater Corporation. Free brochure on request.

This "package preheater" is for boilers in the 25,000 to 200,000 pound per hour range

The Package Ljungstrom operates on the continuous regenerative counter-flow principle. The heat-transfer surfaces on the rotor act as heat accumulators. As the rotor revolves, the heat is transferred from the waste gases to the incoming air.

The Air Preheater Corporation 60 East 42nd Street, New York 17, N. Y.

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BULLETINS

(Begins on page 21)

160 **For Coupling Selection**—This 22 by 17 in. coupling selection chart is designed to reduce the time necessary to select a flexible coupling to a matter of minutes. Critical specifications of company's three types of couplings—roller chain, Morflex and silent chain—are charted, with NEMA frame numbers, shaft sizes, bore diameter range and minimum plain bore shown. Morse Chain Co.

161 **Dihedral Couplings**—Eight-pp Catalog 62 features complete working data on sizes, capacities and dimensions of company's Series D-100 standard, floating shaft and mill motor type dihedral couplings designed to handle angular and offset misalignment up to a total of 12 deg. Photos and dimensional drawings provided. Ajax Flexible Coupling Co. Inc.

LIGHTING

162 **New Light Source**—Long life, brilliance, and other advantages of the Fluomeric Lamp which lights without a ballast are presented in illustrated Form 579. Cutaway diagram illustrates component parts and operation principle. Duro-Test Corp.

163 **Outdoor Lighting**—Modern outdoor lighting for commercial and industrial applications is described in 12-pp Bulletin GEA-6438. Defines basic lighting terms and provides a guide for planning outdoor lighting installations. Typical applications are pictured, as well as such lighting equipment as fluorescent, mercury, and filament luminaires, floodlights, constant-current transformers, transformer controllers, and photoelectric controls. General Electric Co.

164 **Lighting Panels**—Three new bulletins on lighting panels are announced by the company. Bulletin L-110-H on Alba-lite panels, Bulletin L-110-A on low-brightness lens panels, and Bulletin L-110-C on Crysta-Lite panels gives complete product and photometric data. Tables for calculating illumination and light utilization levels are also included. Corning Glass Works.

WATER CONDITIONING

165 **Surface Type Deaerator**—Publication 4654 describes a deaerator design best suited for hot water line protection in industrial plants and other types of buildings. Tells why this type of deaerator economically provides a supply of hot water free from objectionable odor or taste that might be due to steam and fully deaerated to prevent corrosion. Cochrane Corp.

166 **Zeolite Softeners**—Eight-pp Bulletin 105 describes principle of operation, applications and construction features of company's zeolite water softeners, engineered hydraulically and mechanically to provide optimum flow rates, maximum capacities of ion-exchange minerals, efficient utilization of the regenerant. Specifications, layout, dimensions and engineering data are included. L. A. Water Softener Co.

167 **Tray-Type Deaerator**—Publication 4652 describes a tray-type deaerator designed to provide complete deaeration, and tells how continuous maintenance of perfect heat balance eliminates waste of steam or heat and how more heat can be recovered and returned to boiler if exhaust steam is used. Cochrane Corp.

METALS

168 **Alloy Steel Machine Parts**—How alloy steels extend machine tool service life is detailed in this illustrated bulletin. A discussion of the strength, toughness and wear resistance offered by alloy steels for modern machine tools is featured. The International Nickel Co., Inc.

169 **Powder Metallurgy Products**—Engineering Manual E-56, 50 pp, contains descriptive and specification data on company's powder metallurgy products, including bearings, finished machine parts, and permanent metal filters. For the bearings, typical properties are tabulated, design features are described and illustrated, and information on lubrication and machining included. Permanent metal filters for gases and liquids are covered, with paragraphs on filtering, diffusing, separating, snubbing, metering, flame arresting and sound deadening. Typical properties of filters are detailed on chart and flow charts included. Amplex Div., Chrysler Corp.

Among This Month's New Literature of Merit . . .

170 **Drafting Procedures**—This 56-pp booklet features standards on drafting room practice and simplified drafting. Results of a comparative test made by company between standard and simplified drafting practices are discussed and details on traditional and simplified procedures show how this company has put into practice simplified drafting as a "supplement" to standard practice. To expedite cross reference between specific items in the standard and simplified sections, similar numbers are used for similar paragraphs. American Machine & Foundry Co.

171 **Welded Chain, Assemblies**—Over 25 types of welded chain and chain assemblies, plus a complete line of accessories, are featured in 62-pp Form ADV-701. Specifications are the latest, and descriptive copy is arranged for easy reading. Types of welded chain listed include proof coil, BBB, Republic alloy, high test, and a variety of other standard and special chain types. General information section on welded chain includes points on care and maintenance, suggestions for correctly measuring and ordering chain. Republic Steel Corp.

172 **Ovens For Industry**—This 36 pp booklet describes through pictures and text the varying sizes and types of industrial oven installations, providing a cross-section of ovens designed, fabricated and installed for industry. Included are twin rock wool ovens, cooling tunnels, foam rubber dryers, battery plate dryers, metal tube dryers, permanizers and pharmaceutical product dryers, ovens for testing, paper products drying, motor stator baking, automotive accessories, pit-type oven for baking varnish on armatures, ovens for finishing "job shop" products, building materials, metal furniture, others. The Kirk & Blum Mfg. Co.

173 **All About Wire Rope**—As described in this pocket-size, 96-pp manual, wire rope is a machine, with many individual and closely related parts that move and operate in a certain predetermined way when rope is in use. Profusely illustrated with photos and helpful cartoon-type drawings, manual offers extensive information on the selection, installation, and best operating practices of wire rope. Rope diameter data, breaking strengths, weights per foot in pounds, and other practical engineering data are presented in a series of tables. Jones & Laughlin Steel Corp.

174 **Filtration Manual**—Current literature and engineering data on filters and filtration has been assembled in a single convenient filtration manual, FC-1, 32 pp. Profusely illustrated with photos, diagrams, drawings, charts and tables, the manual tells why and where filters are used, and contains complete selection and application data, including flow charts, quick calculations for sizing up a filter application, viscosity-temperature chart, and a glossary of filtration terms. Purolator Products, Inc.

HEATING AND COOLING

175 **Industrial Electrical Heaters**—Revised Catalog 27-620, 30 pp, describes industrial electrical heating units and devices. Contains information and design selection chart on strip heaters, natural and forced convection air heaters, oven heaters, immersion heaters, cartridge heaters, melting pots, industrial hot plates, and heater control equipment. Westinghouse Electric Corp.

176 **Plate Coils**—How company's Platecoil, designed for heat transfer applications, saves engineering, fabricating, installation, operation and maintenance costs is detailed in 8-pp Bulletin IP-356. Applications are described and specifications and selection data are included, along with photos, drawings and pictures of installations. Platecoil Div., Tranter Mfg. Inc.

177 **Sectional Heat Exchanger**—Bulletin 132 illustrates and explains the functions of the Sectional Aero heat exchanger. This self-contained system is designed to provide cooling of liquids in industrial plants independent of a large supply of cooling water and with additional savings of installation and operating expenses. Niagara Blower Co.

178 **Refrigeration Condensing Units**—Form G-141, 24 pp, describes company's ¼-through 3-hp line of semi-hermetic condensing units and high torque motor compressors. Photos of each flat base and raised base model are included, as well as top and side schematic views, temperature applications, specifications, capacity data, temperature ranges and electrical characteristics for motor compressor units. Brunner Mfg. Co.

TOOLS, WELDING

180 **Electric Power Hammer**—The many maintenance and construction jobs that can be accomplished with company's electric power hammer are described in 8-pp Form 5199. Cutaway view of the tool shows component parts and photos illustrate typical jobs. A list of accessories is included. Ingersoll-Rand.

181 **Welding Directory**—Specific types of work and properties of various types of weld metals are described in 28-pp Catalog SB-1352. Features electrodes for the welding of stainless steel, non-ferrous weld metals, cast iron, and hard surfacing, and describes applications of each, properties of deposited metal, hard surfacing, with a hard surfacing guide included. The Lincoln Electric Co.

CLEANING, FINISHING EQUIPMENT

182 **Industrial Finishing Equipment**—Catalog A-657, 12 pp, describes a complete modern finishing system for cleaning, rust proofing, drying, painting and finish baking operations. Typical finishing systems handling a variety of products are pictured and details on how system can be designed to accommodate any product and meet any production requirement are furnished. Dust and fume control systems are also covered. The R. C. Mahon Co.

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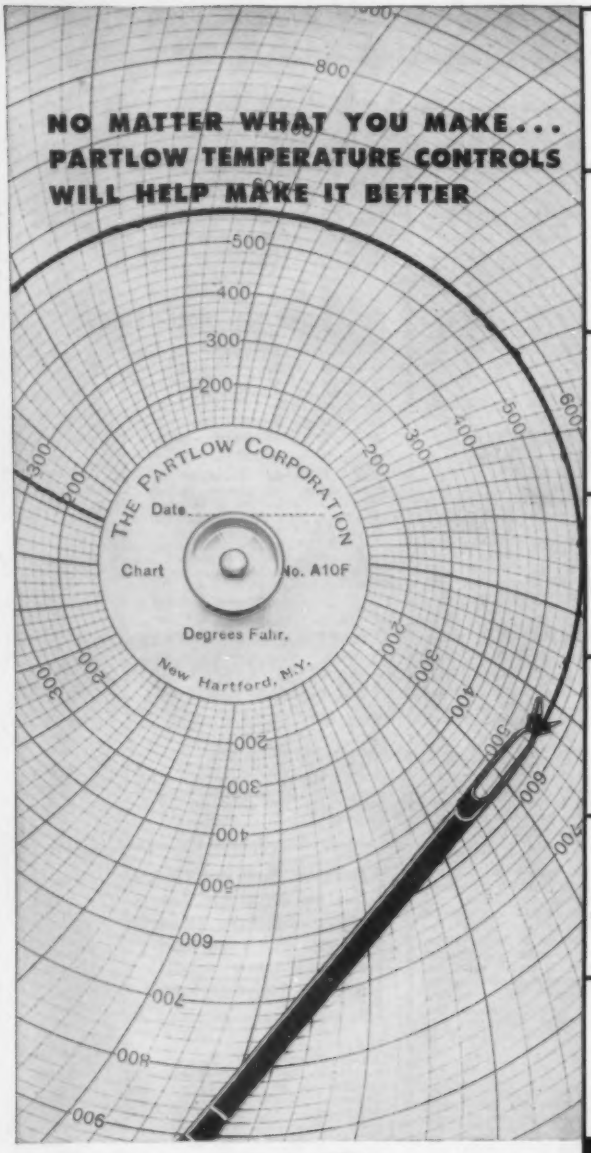
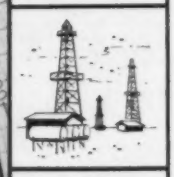
183 **Electrostatic Painting**—Advantages of company's No. 2 electrostatic spray painting process are described in this 16-pp illustrated bulletin. Typical applications in various types of industries are pictured, laboratory test facilities and services are described, and a table detailing scope of the process, from the type of article that can be coated and the type of coating, to power required and maintenance, is furnished. Ransburg Electro-Coating Corp.

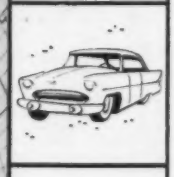
184 **Airblast Cabinet**—Eight-pp Bulletin 607 describes the EN-2 blast cleaning cabinet for small or intermittent work. Contains photos and drawings, and tabulated dimension and specification data. Pangborn Corp.

185 **Vapor Degreasers**—A definitive manual, this 24-pp catalog covers use, operation and maintenance of all types of vapor degreasing equipment. Features perspective drawings and cutaway schematics covering every type of degreaser, including straight vapor, vapor and liquid, and special systems which embody vapor phases. Installation, operation, accessory equipment, trouble-shooting and solvent recovery are covered, as well as solvents, service, metal washing equipment. Circo Equipment Co.

186 **Safety Solvent**—Folder A-28 describes a detergent-action safety solvent designed primarily for the in-place cleaning of electrical equipment, also ideal for hand wiping of small parts, pre-cleaning prior to flaw detecting operations, grease pencil, chalk or ink removal, as well as other cleaning jobs. Charts cover toxicity, flash point throughout evaporation cycle and evaporation rate. Turco Products, Inc.







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BULLETINS

(Begins on page 21)

PLASTICS, SYNTHETICS

187 **Non-Woven Fabric**—The qualities and extensive uses of Lantuck—a versatile non-woven fabric—are described in this 16-pp booklet. Two pages are actually made of the material in a nylon-rayon combination of fibers, specially finished to take clean, sharp imprints. Important features such as strength, unlimited fiber variety, wide, flexible range are stressed and applications are listed. Wellington Sears Co.

188 **Plastic Film Comparator**—This handy slide rule compares cost and properties of Mylar polyester film with those of other materials. One side of the pocket size comparator determines cost per sq ft of Mylar compared with other materials, and the reverse side matches physical, chemical, thermal and electrical properties of the product with polyethylene, acetate, acetate-butyrate, polystyrene, rag paper, varnished cambric, and polyvinyl chloride. E. I. Du Pont De Nemours & Co.

PLANT PROTECTION

189 **Fire Alarm Systems**—This 10-pp bulletin is designed for preparation of fire alarm specifications. It is concerned primarily with systems that warn all occupants of building being protected, such as would be installed in institutional and industrial plants. Application of National Fire Protection Association Code No. 72 is discussed in detail. Edwards Co., Inc.

190 **Padlocks**—Catalog 56, 20 pp, features descriptions of padlocks to meet every need, with actual size illustrations of entire line. Special long shackle padlocks are included, as well as super security padlocks which have an extra short shackle clearance of only ½ in, and many others. Master Lock Co.

OTHER EQUIPMENT

191 **Maintenance Products**—A variety of products manufactured by company are described in this recent issue of "The Clean Up." Short feature articles offer helpful hints and describe newest advances in clean-up products, including floor finishing, insect extermination, weed eradication, turf pest control, deodorizing, personal cleanliness. The C. B. Dolge Co.

192 **Industrial Tapes**—How industrial imagination and production know-how are combined to improve products and industrial operations while cutting costs is the theme of 20-pp Form 74-49. Applications in a variety of products and industrial problems are thoroughly illustrated and suggestions for meeting specific requirements are offered. Dutch Brand Div., Johns-Manville.

193 **Corrosion-Resistant Equipment** — Bulletin 936 is designed as a buyer's guide to corrosion-resistant process equipment. It lists project engineering facilities for designing a complete new operation or for revamping an existing process, and gives information on custom-built process equipment, glassed steel reactors, columns, heat exchangers and condensers, evaporation equipment, storage, mixing and trailer tanks, accessories. The Pfaudler Co.

194 **Industrial Packings**—Performance characteristics and applications of company's packings are described in 18-pp Catalog PC-102, covering self-lubricating packings, molded packings, sheet packings and gaskets, folded asbestos packings and gaskets, asbestos rope and wick. Photos, cutaway views showing construction features, dimensional data, as well as an application chart are included. Greene, Tweed & Co.

195 **Storage Racks**—Newest literature covering company's line of storage racks, including pallet, skid, drum and barrel, and tool and die, is available in this plastic bound catalog. Designed so that future additions and revisions can easily be inserted, bulletin contains capacity charts, photos and drawings, as well as dimensional and specification data. American Metal Products Co.

196 **Product Guide**—The complete story of this company's contributions to materials han-

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BULLETINS

(Begins on page 21)

dling and power transmitting machinery development is told in profusely illustrated, 44-pp Book 2653. Research facilities are described, as well as standard products and engineered equipment, major industries served, technical literature available, and manufacturing plants, distributors listed. Link-Belt Co.

197 **Exhaust Purification** — Effectiveness of company's catalytic exhaust purifier in cleaning up carbon monoxide, aldehydes, odors and hydrocarbons found in exhaust stream of an LPG-powered vehicle is given in this report. Includes test data. Oxy-Catalyst, Inc.

198 **Calcium-Base Grease** — Technical Bulletin 46 describes Sun C-891T Grease, said to be compounded to stay put under the worst conditions of dirt, moisture, low speeds, and high loads. Covers applications, physical properties, and lists advantages. Sun Oil Co.

199 **Miniaturization Skills**—This 12-pp brochure outlines company's facilities for sub-contract work in the field of miniaturization. Sets up various applications of watch industry skills in the new field and graphically explains how these skills can be utilized by other industries. A list of case history problems and how they were solved through practical miniaturization is included. Elgin National Watch Co.

200 **Turbine Generator** — Bulletin 1960-C, 35 pp, features turbine generators covering the 1500 to 15000 kw range, and includes information on types and applications, turbine and generator construction, testing and lubrication, sole plates, design features, and lagging. Cutaway view of typical multi-stage condensing turbine and one of an alternating current generator are included, as well as photos of typical installations. Worthington Corp.

201 **Castable Refractories** — Twenty-three grades of castable refractories are covered in this illustrated catalog, classified into five categories — super-duty, first-quality, intermediate duty, abrasion resistant, and insulating castables. Outlines advantages, charts characteristics, lists typical applications. Plibrico Co.

202 **Handy Data Chart**—Now available to plant engineers is an engineering data wall chart giving tables on decimal equivalents, temperature conversion, wire size and current ratings, and includes mechanical and electrical conversion tables. Chart is illustrated with photos of company's power supplies and a-c line regulators. Perkin Engineering Corp.

203 **Auxiliary Coal Equipment** — Bulletin 855, 54-pp, itemizes a complete line of auxiliary equipment for coal handling—bearings, takeups, holdbacks, chain, screen plates, pumps and valves. Also included is specification information on conveyor and drive pulleys, V-belt sheaves, sprockets, gears, shafts and keys. Descriptions are supplemented with photos, dimension drawings, data tables and specifications. McNally Pittsburg Mfg. Corp.

DATA FILE of literature for the plant engineer's library

STANDARD CATALOGS, bulletins and handbooks are listed to help plant engineers maintain a permanent file. To get these free catalogs, circle item numbers of those wanted on postage-free cards provided for you on pages 241-242.

SPACE, PROCESS HEATING

301 **Plumbing, Heating Supplies**—Edition H is the current edition of this company's 126-pp general catalog on plumbing and heating repair parts, tools and accessories. Indexed and generously illustrated; gives sizes, intended uses. J. A. Sexauer Mfg. Co., Inc.

302 **Engineering Data for Heating Systems**—A great deal of helpful information on heating systems is presented in Engineering Data Manual 2695, 28 pp. Detailed illustrated information pertaining to heating problems is given. Besides covering heating terminology, there are sections on steam data, water properties, piping data, weights and measures and pipe dimensions. C. A. Dunham Co.

303 **Hot Water for Industry**—An excellent engineering data booklet, "Hot Water for Industrial Plants," is a compilation of literature covering use of water heaters for process needs, cafeterias, lavatories, wash fountains, laboratories. Discusses hot water requirements for these applications; describes and illustrates heaters, recovery systems, booster units applicable; provides installation suggestions and operating instructions. Available to qualified plant engineers. A. O. Smith Corp.

304 **Unit Heaters** — Catalog 155, 32 pp, presents unit heaters for steam and hot water in vertical and horizontal delivery and power-throw types. Covers design features and provides performance and capacity data. Also provides information on unit heater selection, sound ratings, locating unit heaters, motor wiring and control. Piping and installation suggestions are included as well as typical unit heater specifications. Modine Mfg. Co.

305 **Gas Heating Equipment**—Comprehensive Catalog GN-56, 24 pp, presents suspended gas unit heaters, both fan and blower types, in capacities from 25,000 to 250,000 Btu; a deluxe suspended unit heater; a floor model; duct furnaces; and a horizontal furnace. In addition to specifications, construction details and dimensions, drawings and tables, catalog also provides installation information and application ideas. Reznor Mfg. Co.

306 **Electric Heat, 101 Ways**—Principal industrial heating applications and methods are described in "101 Ways to Apply Electric Heat," a 32-pp booklet. Illustrated case histories show how metal-sheathed electric heating units are being used. Physical aspects of installation are detailed along with a discussion of the problem, solution and advantages obtained. To illustrate liquid heating, diagrams and photos show best applications for the elements and heaters. Similar treatment is accorded problems of heating air and gases; melting soft metals and viscous materials; and heating machinery and equipment parts. A section is devoted to far-infrared heating. Edwin L. Wiegand Co.

307 **On Unit Heaters**—Latest improvements, specifications and performance data for Hermen Nelson horizontal and vertical unit heaters are covered in 36-pp Bulletin 700A. Includes complete hot water and steam performance tables, dimensions, selections, applications, descriptions of cabinets, elements, motor mountings, fans and accessories, controls. Also provided are suggested layouts, piping diagrams, other data. American Air Filter Co., Inc.

308 **Revolving Unit Heaters** — Bulletin HR-64, 16-pp, features revolving unit heaters for industrial plant heating, presenting design and construction details and showing typical installations. Engineering data, mounting heights and coverage, and dimensions are tabulated, and dimension drawings are included, along with installation planning tips and specifications. L. J. Wing Mfg. Co.

309 **Industrial Ovens** — Thirteen types of company's Conventioneered ovens, which apply principles of forced convection heating to various industrial processes, are illustrated and described in 12-pp Bulletin 200. These ovens serve foundries, metal finishers, plastics producers. The W. W. Sly Mfg. Co.

310 **Hot Water Heating Systems**—Catalog GK-954, 24 pp, features a complete line of equipment for forced hot water heating systems and chilled water cooling systems. Nine pages are devoted to information on a complete line of circulating pumps for dozens of applications. All-bronze pumps for circulating service water and silent operating centrifugal pumps for boosting water pressure are a few of the new applications. Valves, fittings, air vents, air tanks are also described. Bell & Gossett Co.

311 **Industrial Ovens** — Engineering, manufacturing and installation of processing ovens are described in Bulletin D-53-20, 16 pp. Covers oven types, application to industry source of heat, selection of heater, control of heat, distribution of heat. Photos show typical oven installations, and a complete modern finishing process is presented. Newcomb-Detroit Co.

INSULATION

312 **Industrial Insulation**—This 8-pp bulletin describes Alltemp, an all-temperature pipe and block insulation from 100 to 1600 F. Physical characteristics, recommended thickness data, method of application are included, with 10 advantages of this insulation. Other industrial insulations also described from 2500 F to sub-zero. Information on Engineering Service offered by company also listed. The Philip Carey Mfg. Co.

313 **Piping Insulation** — Seven-pp Bulletin SO 1054 features a snap-on, one-piece molded pipe insulation of fine glass fibers for hot or cold piping. Specifications are given for industrial, commercial, and institutional piping where maximum efficiency is of primary importance and for hot water and low pressure steam. Gustin-Bacon Mfg. Co.

VALVES, TRAPS, PIPING AND ACCESSORIES

314 **Bronze Valves**—Globe and angle bronze valves with rising stems, union bonnets and stainless steel plug type seats and discs are described in this bulletin. Discusses design advantages, gives dimensions. The Walworth Co.

315 **Diaphragm Valves**—Catalog V-55, 34-pp, covers operation, installation and selection of diaphragm valves for handling of acids, alkalis, gases, volatile and viscous substances, water and other fluids, compressed air, vacuum, slurries, semi-solids, beverages and food products. Diaphragm materials are described, selection tables included. Hills-McCanna Co.

316 **Lubricated Plug Valves**—Catalog PV-4, 36-pp, shows in detail a line of iron and steel lubricated plug valves. Many illustrations of single, screwed and bolted gland type valves are shown, including photos, sectional and detailed drawings. Also included is physical data on dimensions, ratings. The Wm. Powell Co.

317 **For Quick Valve Selection** — Here's a 20-pp catalog digest providing ordering and application information on gate, globe, angle and check valves in bronze, iron, cast and forged steel construction, also valve accessories and parts. Illustrated, includes pressure-temperature chart. The Ohio Injector Co.

318 **Valve Performance Facts**—Included in this 36-pp booklet are 32 case histories of cost-saving valve installations. Service applications covered include steam, oil, water, coating fluid, chlorine, phenol, pulp stock, vacuum, others. Industries include paper mills, refineries, central stations, other plants. Crane Co.

319 **Butterfly Valves** — Construction details, engineering and application data on butterfly valves are provided in three illustrated bulletins. Eight-pp Bulletin 557 covers those of standard heavy-duty construction; Bulletin 558, 8 pp, those of standard medium-duty construction; and Bulletin 559, rubber-lined butterfly valves. W. S. Rockwell Co.

320 **Bronze Valves**—Bulletin 110 points out the advantages of company's "500 Brinnell" bronze globe and angle valves with stainless steel seat and disc. Design features are illustrated and dimensional data is included. Kennedy Valve Mfg. Co.

321 **Corrosion Resistant Valves**—Monel and nickel corrosion-resistant valves are described in Bulletin 9. Discusses corrosion-resistant

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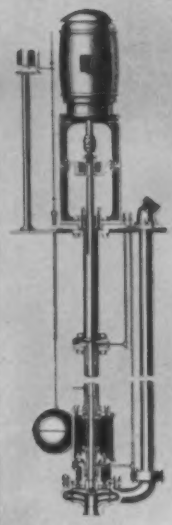

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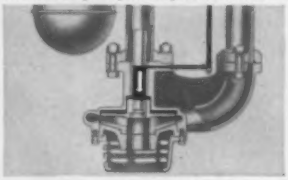

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DATA FILE

(Begins on page 246)

properties of Monel and nickel, listing specific application for which each is suited. Gives casting composition of both alloys and describes their mechanical properties. Cross-sectional illustrations of gate, globe and check-type valves are included. Alloy Steel Products Co.

322 **Automatic Regulators**—Illustrated information on 12 basic control valve types used in chemical process industries, power generating facilities, and in liquid or gas pressure control applications requiring precise instrumentation by automatic regulators is presented in this bulletin. Reducing valves, pump governors, relief valves, temperature regulators, float valves, damper regulators, combustion control valves, and boiler feedwater regulators are among the items treated. Atlas Valve Co.

323 **High Pressure Valves**—Bulletin B-451, 12 pp, contains complete engineering data on company's valves for high pressures and high temperatures. Typical installations are pictured, dimensions and weights are tabulated, and temperature-pressure ratings are shown. A selection table in included, as well as information on materials, design. Yarnall-Waring Co.

324 **Control Valves**—Air and hydraulic control valves designed for high-speed, rugged performance are the subject of 6-pp Bulletin 561. Advantages are pointed out and a number of different models are illustrated, including single solenoid valve, double solenoid valve, pilot operated valves, and lever operated valves. A drawing illustrates design and construction features. C. B. Hunt & Son, Inc.

325 **Steam, Air and Gasoline Traps**—Catalog 751, 32 pp, is a trap ordering book with capacity tables, installation diagrams, and containing charts and formulas for determining proper size trap for specific applications. Covers thermostatic steam traps, expansion steam traps, weight-operated traps for steam, air, gasoline, pressure up to 1500 lb. W. H. Nicholson & Co.

326 **Steam Trap Book**—Catalog J is a 44-pp manual and ordering guide in which 17 pp are devoted to data on fundamentals of good trapping and trap selection. Installation and maintenance instructions are also provided. Book lists steam traps for maximum pressures of 250, 600, 900, 1500 and 2500 psig. Included, also, is a section on trouble shooting. Armstrong Machine Works.

327 **Unions, Check Valves**—Illustrated Catalog 55, 24-pp, describes and provides ordering information on a line of forged steel unions and check valves. Socket-weld, high-speed, orifice, Q-ring and other unions are included. Catalog provides service recommendations, dimensions and list prices. Also included is table covering discharge of water to atmosphere. Clayton Mark & Co.

328 **Jacketed Piping, Cocks**—Twelve-pp Bulletin 152 discusses the special advantages, problems and requirements of jacketed piping installations and shows how manufacturer's jacketed piping, cocks, fittings and relief valves are designed to fulfill requirements. Illustrated with photos and drawings, includes specifications. Parks-Cramer Co.

329 **Aluminum Pipe and Fittings**—Aluminum pipe—for conveying everything from air to acid—is described in this 18-pp Form AD197. Booklet presents characteristics and advantages for each major field of application. Specifications are provided, along with a description of appropriate fittings and methods of installation. Describes process industry applications and advantages. Similar treatment is accorded other fields, including pipelines, portable piping, and structural piping. Aluminum Co. of America.

330 **Glass Pipe and Fittings**—Corrosion-resistant qualities of this Pyrex brand glass pipe and fittings which make it suitable for use under corrosive conditions are described in 18-pp Bulletin EA 3. Operating temperatures, physical characteristics, installation procedures are covered and specifications and dimensional drawings are included. Corning Glass Works.

331 **Pipe for Modern Buildings**—This 16-pp booklet discusses wrought iron pipe for modern buildings. Identifies wrought iron pipe and describes composition and advantages. Included are sections on wrought iron's resistance to corrosion and fatigue stresses, weldability, forming and threading, as well as the application of protective coatings to the material. Pictures illustrate applications. A. M. Byers Co.

332 **Plastic Pipe, Fittings**—Two types of unplasticized PVC pipe and fittings are described in 6-pp Bulletin T.D. 119, a normal impact grade and a high impact grade. Advantages of both types are given. Applications are listed by industry and process, and the full range of corrosion resistance is defined. Tables show physical properties, dimensions and weights, working pressures, burst pressures, other data. Installation instructions included. The Carpenter Steel Co.

333 **Improved Hose Coupling**—A quick connect-disconnect hose coupling for water, oil, steam, gas and chemical lines is described in this 16-pp bulletin. Describes the coupling's construction and explains how it provides a sealing action which makes the coupling tighter as internal pressure increases, and a full swiveling action that prevents hose twisting and kinking. Titeflex, Inc.

334 **Welding Fittings**—When and where to use company's Weldolet welding fittings is told in 38-pp Bulletin W-4. Includes tables listing sizes, dimensions, weight, and price, as well as dimensional drawings. Installation procedure is fully described and specifications, graphs providing reinforcing information, and photos of typical applications are also included. Bonney Forge & Tool Works.

LUBRICANTS, LUBRICATION

335 **Centralized Lubrication** — Pocket-sized 24-pp, Form 34-22, called "Ask Anyone in Industry" describes in comic-book form the hazards and inefficiency inherent in conventional lubrication practice and promotes use of centralized lubrication—in the form of Alemite Accumeter measuring fittings. Shows how these are connected by tubing to a lubrication pump which is controlled by a timer. Alemite Div., Stewart-Warner Corp.

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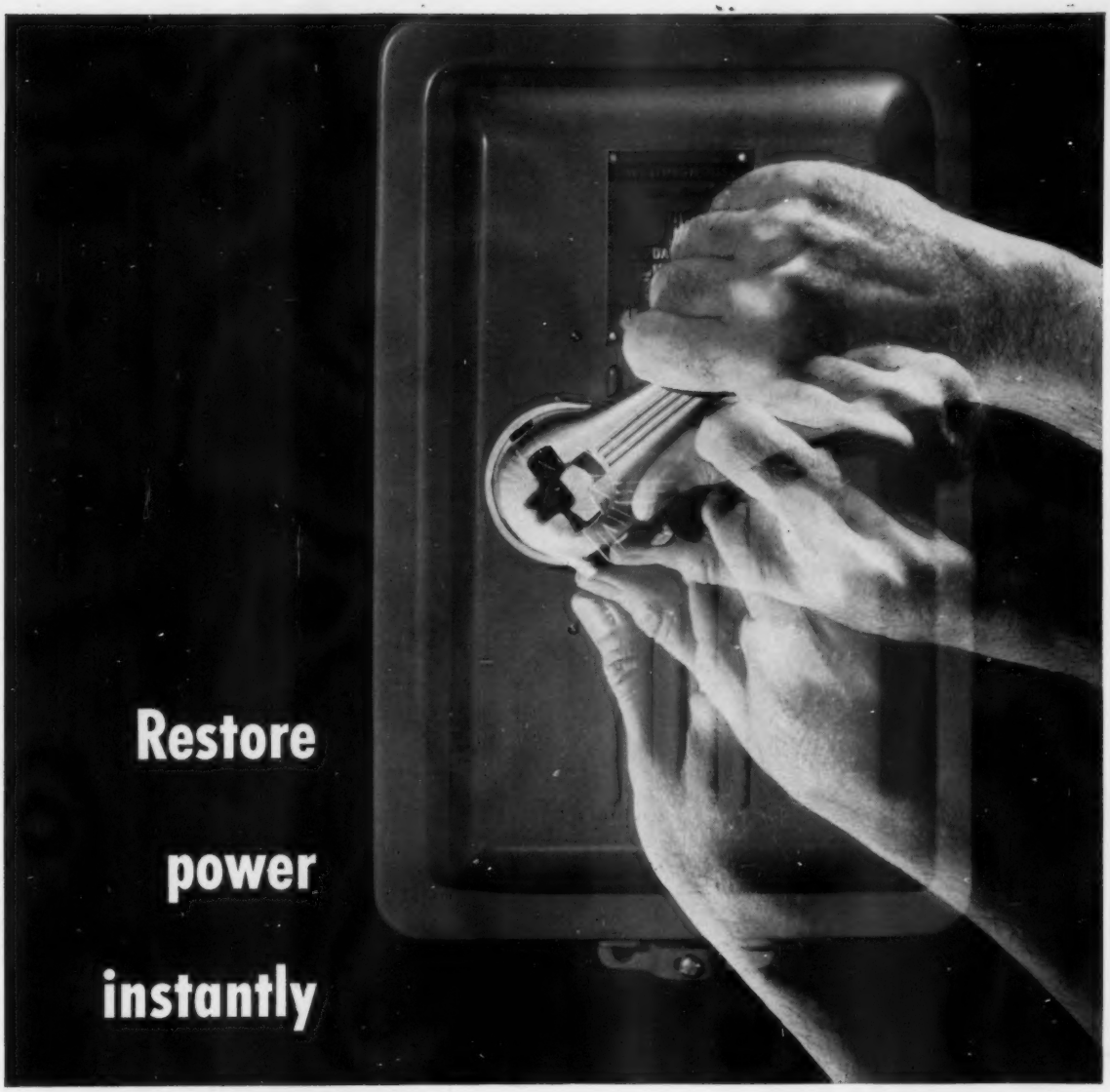

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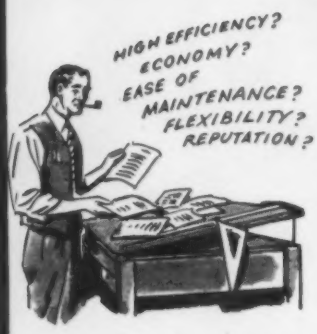

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DATA FILE

(Begins on page 246)

336 Lubricants—Specification, Classification—Vital information on selection of lubricants is presented in 10-pp Vol. 41, No. 4 of "Lubrication." Covers such items as performance specifications, initial suitability of lubricants, quality of lubricant, effect of lubricant on production, effect on maintenance, effect on power, effect on cost, and features a look to the future. The Texas Co.

337 For Better Lubrication—Advantages of company's lubricants which are specially compounded for lubrication of reduction gear drives are outlined in this pocket-sized folder. Features which assure smooth, trouble-free gear drive performance and lower maintenance costs are listed. Gulf Oil Corp.

338 Lubrication, Coolant Systems — Illustrated Bulletin 1450 describes company's lubrication and coolant systems and contains pictures of typical installations and a diagram of a mill lubrication system. Also describes a compact "packaged" lubrication system designed to meet the need for an economical, full pressure feed lubrication system in capacities to 50 gpm. Dravo Corp.

MECHANICAL POWER TRANSMISSION

339 Roller Chains, Sprockets—Catalog 754, 64 pp, describes, illustrates a line of roller chain stock sprockets, including minimum bore sprockets for reboring, also finished bore and Taper-lock bushed sprockets which are ready to use. Tables show speed ratios for sprocket combinations, standard keyways and setscrews. Includes chain selection and application data, installation and lubrication recommendations, chain length calculations, dimensions and price lists for single and multiple strand roller chains. Diamond Chain Co.

340 Sprockets and Chain—Bulletin A-624 24 pp, is compiled to provide plant engineers with all data required for selecting and ordering roller chain and sprockets. Devotes a page to Taper-Lock sprockets for each size of chain from 40 to 100, giving sectional drawing, dimensions, number of teeth, maximum stock bore available, weights, prices and other data. Another page covers Taper Lock bushings; and full information is given on riveted and cotter-type roller chains. Dodge Mfg. Corp.

341 Power Transmission Equipment—Form 118, 24 pp, gives descriptive and technical information on variable speed pulleys, wide V-belts, sheaves, motor bases, countershafts, and Select-O-Speed transmissions. Illustrated with photos and dimensional drawings, booklet provides ratings, sizes, application and installation tips. Lovejoy Flexible Coupling Co.

342 Fluid Couplings—Bulletin 144-D, 14-pp, presents complete intallation and performance data on fluid couplings. Illustrated with diagrams and drawings, bulletin shows ease of applying company's fluid couplings on any type industrial equipment, powered by any type electric motor or internal combustion engine from ¾ to 850 hp. Describes standard models providing standard input, output combinations, and standard models in packaged units. Installation hook-ups are given, along with typical applications. Twin Disc Clutch Co.

343 Flexible Couplings — Condensed Engineering Catalog 51-A contains excellent data on the choice and use of company's flexible metal couplings for power transmission. Tells advantages of these couplings and discusses design principles. Double-flexing and floating shaft types, light duty couplings and types for special applications are described and pictured in detail. Thomas Flexible Coupling Co.

344 Coupling Data—Bulletin 240 describes a quick-connect, quick-disconnect H coupling, its uses and construction, with particular reference to U-packer which gives positive seal without compression set because of rubber distortion. A fully detailed cutaway of coupling is included and dimensions and ordering information given. Snap-Tite, Inc.

345 Improved V-Belts—This literature on company's Vulco rope drives explains how this rope with concave sides is designed to fill out to a precise fit in the sheave groove, to provide less wear, more pulley contact and more sure power when needed. The Gates Rubber Co.

346 Adjustable Speed Drives—Bulletin PB-4700-1 describes company's packaged adjustable speed drives—covering latest developments in design and construction. Tells how these packaged, pre-wired, pre-assembled units provide flexibility of d-c motor performance from an a-c power supply, and offer simple, convenient speed adjustment without intermediate speed changing equipment or line shafting. Crocker-Wheeler Div., Elliott Co.

347 Fluid Drive—Eight-pp Bulletin 9819 describes and illustrates adjustable speed Gyrol fluid drives, 1- through 25-hp, giving advantages and applications. Components and operation are covered in detail and selection tables are provided for direct connected and V-belt types. American Blower Corp.

ELECTRICAL

348 Motor Buying Guide — Bulletin GEC-1026, 28-pp, features company's standard a-c fractional and integral horsepower motors in most general use. Included are general- and definite-purpose, fractional horsepower motors, and fhp gear motors. A section on selection of integral horsepower motors covers horsepower requirements, enclosures, starting current limitations, speeds, motor types, and selection of fuses and circuit breakers. Descriptions and specifications cover single-phase, polyphase, totally enclosed fan cooled, and gear-type integral horsepower motors. Photos, ratings, dimensions, weights, frame numbers, and modifications included. General Electric Co.

349 Motors for Many Jobs—Bulletin 1878 is a colorful, 8-pp revamped publication including a more complete line of company's motors. Descriptions and illustrations cover open-type Uniclosed designs, totally-enclosed and explosion-proof types, Varidrives, Synchrogears, and right-angle models; also vertical motors and Verticlosed hollowshaft types. U. S. Electrical Motors Inc.

350 FHP Manual Starters—Bulletin 224 is a folder giving the features and ratings of a line of fractional horsepower manual starters. Lists applications for them. Square D Co.

351 Testing Instruments — Bulletin 19-56, 16-pp, features company's electrical testing instruments, including ohmmeters, ground testers, dielectric test sets, motor rotation tester, cable fault locating equipment, transformer turn ratio test sets, corona test equipment, frequency meters, tachometers, others. Includes photos and descriptions of each type, including chief features, operating ranges, and suggested applications for them. James G. Biddle Co.

Reader Service Cards for ordering catalogs are on pages 241-242. Be sure to include your name, job title, and company.

352 Enclosed Switches—Catalog 83, 28-pp, describes in detail enclosed switches for industrial applications. Included are general switches designed for use on either a-c or d-c purpose switches, sealed switches, heavy-duty limit switches, hand operated switches, and maintained-contact switches, all of which are available in a variety of actuator designs, contact arrangements and electrical ratings. Photos, dimensional drawings, circuit diagrams, electrical data are included. Micro Switch, Div., Minneapolis-Honeywell Regulator Co.

353 Commutator Slip Ring Maintenance—This practical little 40-pp handbook gives procedures and methods for commutator and slip ring maintenance. Generously illustrated with photos and sketches, booklet contains sections devoted to common troubles and their corrections; brushes; general maintenance; and company's products for maintenance of commutators and slip rings. Defines commutator terminology. Ideal Industries, Inc.

354 High-Capacity Fuses—Form HCS, 6 pp, describes fuses of unlimited interrupting capacity on voltages to 600, designed to afford protection for loads of 600 to 5000 amp. Includes test data, charts on opening time, current limiting effect. Bussmann Mfg. Co.

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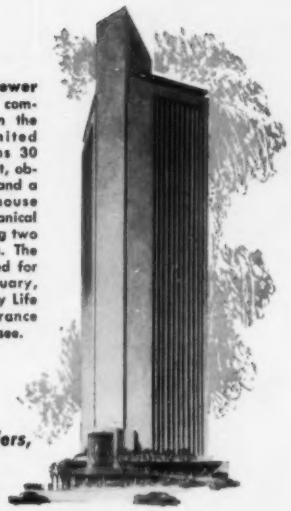

Life and Casualty Tower will be the tallest commercial structure in the southeastern United States. It contains 30 floors plus basement, observation platform and a three-story penthouse containing the mechanical equipment—including two VP package boilers. The building is scheduled for occupancy in January, 1957. It is owned by Life and Casualty Insurance Company of Tennessee.

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The completely shop-assembled VP Boiler, shown at left, is available in fourteen sizes from 4,000 to 40,000 lb steam per hr ... for operating pressures up to 500 psi ... for pressure firing of liquid or gaseous fuels. The VP Boiler has more water-cooled area per cubic foot of furnace volume than any other boiler of its size and type. The larger lower drum—30-inch diameter—permits a simple, symmetrical tube arrangement ... greater water storage capacity ... easy access for washing down or inspection. A low speed centrifugal fan which is exceptionally quiet in operation is standard equipment. The simple baffle arrangement results in low draft loss ... simple soot blowing ... no dead pockets ... high heat absorption. The VP is enclosed in a reinforced, gas-tight, welded steel casing, and shipped completely assembled with firing equipment, fittings and forced draft fan. For foundation, the VP Boiler requires only a simple concrete slab.

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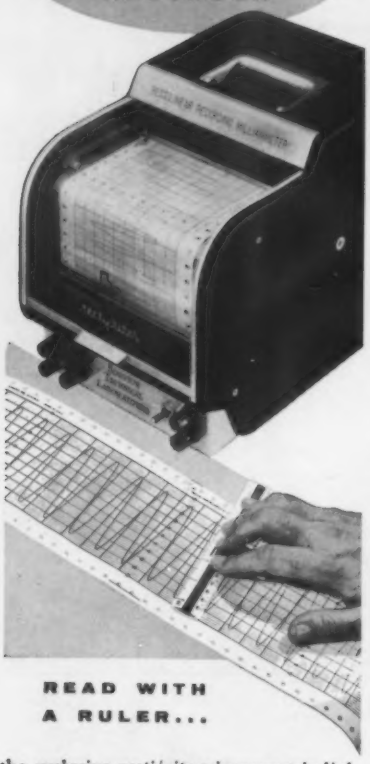

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DATA FILE

(Begins on page 246)

355 Aluminum Conduit Fittings—To fulfill the need for electrical equipment made of materials which resist corrosive attack of many chemicals destructive to ferrous or standard aluminum equipment, Bulletin 2681 presents a broad selection of Condulets and related equipment utilizing copper-free aluminum alloy in their construction. It includes Condulets, lighting fixtures, plugs and receptacles and others for both hazardous and non-hazardous locations. Book provides a pictorial-descriptive index plus ful catalog listings, prices. Crouse-Hinds Co.

356 Panel Components—Bulletin EE-120 is a 54-pp panel builders handbook of electrical components, containing specifications, diagrams, dimensions, photos and price lists of company's motor control. Profusely illustrated with photos, dimensional and wiring diagrams, bulletin covers manual starters, relays and contactors, magnetic starters in non-reversing, reversing, and multi-speed types, and a group of accessories which include thermal overload relays, oil tight pushbutton units, limit switches, timing devices, solenoids, electrical interlocks, and solenoid-operated brakes. Cutler-Hammer, Inc.

357 Wire and Cable—Bulletin 1096, 16-pp contains detailed information on electrical wire and cable, as well as insulation and protective covering. Two selection charts—one by application and environment and one by cable type—are a practical guide to selection of best cable for a particular application. Minimum standard industry specifications are listed. Trade names are also given. The Okonite Co.

358 Electrical Conduit—This 8-pp bulletin, Form 646, describes company's heavy-duty, rigid steel electrical conduit, reproducing test data sheets to show how the protected conduit stands up under corrosive attacks of salt spray, sulfuric acid, caustic acid, and exposure to excessive heat. Four-color photos illustrate the effects on this and other conduit after exposure to attacks listed above. National Electric Products Corp.

359 Switch Wiring Diagrams—Bulletin 709 is a 36-pp booklet of typical wiring diagrams for across-the-line starting switches. Indexed and arranged for easy use, this booklet serves as a guide to some of the many ways in which this company's manual and magnetic across-the-line starters can be applied. Some of the diagrams incorporate more than one useful feature. Includes key to electrical symbols used. Allen-Bradley Co.

360 Low Voltage Switchgear — Twelve-pp Bulletin 6004B presents low voltage switchgear of the metal-enclosed, drawout type for indoor and outdoor installation using Types K and LG air circuit breakers. Design and construction details are explained and illustrated and emphasis is placed on safety advantages afforded by test position with door closed. General specifications and standard frame arrangements given. I-T-E Circuit Breaker Co.

361 Carbon Brushes—Catalog GEA-5597A, 24 pp, contains complete information on company's carbon brushes for motors and generators from one horsepower up. Four main types are described, and characteristics, applications, mechanical design, construction features, brush maintenance and other subjects are covered. Drawings, photos, diagrams and tables of vital statistics amplify the text. General Electric Co.

362 Battery Manual—Battery selection techniques are emphasized in 20-pp Bulletin 210, a revised edition of this manufacturer's manual on storage batteries for stand-by power, emergency lighting and switchgear applications. A discussion of charging equipment and simplified battery maintenance procedures is included. Storage battery installation procedures are described and illustrated by photos. Exide Industrial Div., The Electric Storage Battery Co.

363 Handbook on Storage Batteries—This 64-pp booklet of instructions and technical data is the sixth edition of this company's battery service manual. Provides a brief treatise on the theory of the lead-acid battery. Gives detailed instruction on the care and operation of batteries, on maintenance and repairs, and on standard and special parts. Booklet is of special value to plant engineers concerned with storage batteries for cycle service in industrial trucks and materials handling equipment. Gould-National Batteries, Inc.

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DATA FILE

(Begins on page 246)

364 Motive Power Batteries — This 48-pp general service manual on lead acid batteries for all types of motive power application is a practical guide to industrial cycle service, including industrial truck, air conditioning, and others. Includes photos, charts, tables, methods of repair, maintenance and theory of operation, instructions covering repairs with regular or special tools, simplified testing methods, including safety practices, acid handling precautions, and charging methods. C & D Batteries, Inc.

365 Flexible Cords — This well-illustrated 24-pp booklet includes all new Underwriters' classifications for flexible cords manufactured by this company. Featuring data on Dynaprene and rubber jacketed cords as well as braid covered types; also gives tips on how to select proper cord. Whitney Blake Co.

366 Cable Troughs—This 12-pp catalog offers a simple solution to any design problem of change of direction or elevation with a complete set of standard fittings, horizontal elbows, inside and outside vertical elbows, ties, crosses, covers and many special fastening devices to save time and labor. Contains full instructions for installations, load charts, accessory items, some typical installations and full list of distributors. The Globe Co.

367 Asbestos Insulation—"Specifications for Asbestos Varnished Cambric N.E.C. Type AVA Lighting Wire and Power Cables," 8 pp, establishes performance tests for asbestos insulation applied as a felted wall in combination with varnished cambric tapes for wires and cables with 600 and 1000 v ratings. Also measures plus values of the construction over and above industry standards. Standards for test characteristics, such as minimum permissible breakdown after initial dielectric test are covered. Rockbestos Products Corp.

LIGHTING, COMMUNICATIONS

368 Fluorescent Lighting—This 24-pp fluorescent lighting guide book is a reference digest on fluorescent products. Gives advantages of this type of lighting; summarizes various lamps and parts, including starter sockets, lampholders. Includes reference chart for lamp performance when interchanged with typical ballasts. Sylvania Electric Products Inc.

369 Guide to Luminaires — Pocket-size, 28-pp Bulletin B-5799-BB covers fluorescent luminaires for industrial and other use. Summarizes salient features of each type of luminaire as it discusses electrical characteristics, maintenance and mounting data, details of construction, dimensions, and recommendations for application. Also contains a pictorial guide to floodlights and incandescent luminaires for industrial and other use. A 4-pp tabulation of buying data concentrates information needed for procurement. Westinghouse Electric Corp.

370 Industrial Lighting Units — The 36-pp 1956 Edition of the RLM Standard Specifications for industrial lighting units contains important revisions in specifications on both incandescent and fluorescent industrial lighting units, as well as new lighting data of special value to specifiers. Most important of the changes and additions are new coefficient of utilization tables for eight incandescent and fluorescent lighting units. Calculations are based on latest Zonal Method of computing coefficients of utilization and illumination on room surfaces. Also included are revised light distribution curves on RLM fluorescent lighting units. RLM Standards Institute, Inc.

371 Plant Lighting Planning Guide—This 32-pp handbook of industrial lighting presents economics of a plant lighting program in terms of lower production costs, reduced working time, less fatigue and eyestrain, less spoilage, fewer accidents, better morale. Explains six major steps in initiating, developing and carrying out a lighting program; tells how to select equipment and stresses importance of maintenance. Includes table of recommended levels of illumination. Benjamin Electric Mfg. Co.

372 Industrial Lighting—Designed to be inserted in company's lighting catalog, these two data sheets describe application, construction, installation and wiring details of two types of

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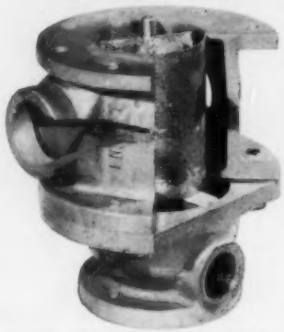

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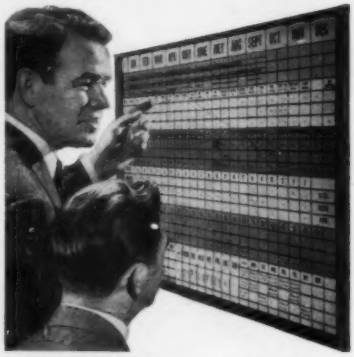

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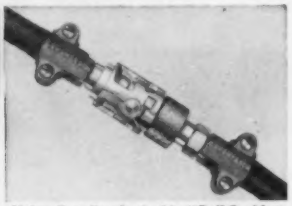

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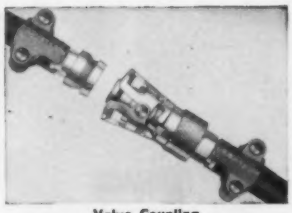

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DATA FILE

(Begins on page 246)

lighting units. Section 30, Sheet 20 features all-porcelain industrial units and Section 30, Sheet 18 covers vapor-tight units. Tables of engineering data are included. Day-Brite Lighting, Inc.

373 **Signal Equipment** — Tips on how to select suitable signals for any specific operation are offered in one of a series of bulletins—Nos. 100-125—bound in this 40-pp catalog. Other bulletins describe horns, bells, warning lights, other signal equipment. Specifications, photos, wiring diagrams, dimensions, audibility rating charts, electrical characteristics and other data included. Federal Sign & Signal Corp.

CONSTRUCTION

374 **How to Glaze with Plexiglas**—Sixteen-pp Booklet PL-23 gives detailed information on glazing industrial and other buildings with flat panels of the acrylic plastic Plexiglas. Written for plant engineers concerned with frequent breakage of windows or other glazing problems. Gives properties and behavior of this sheet. Plastic Dept., Rohm & Haas Co.

375 **Panel Wall Construction**—The advantages of company's M-Type Q-Panel walls are outlined in 12-pp Bulletin Q-35-55. Includes installation photos, diagrams, specifications, as well as drawings pointing out structural details. H. H. Robertson Co.

376 **Glass for Industrial Use**—How glass is used and how to choose the proper type for the application are covered in 12-pp Catalog 56-1. Discusses glass according to function; light diffusion and glare reduction; decoration; protection; and heat absorption. Photos showing various finishes and typical installations are provided, along with performance data, selection and installation tips, light transmission ratings and other data. General advantages offered by company's line of glass are also detailed. Mississippi Glass Co.

377 **Glass Blocks**—This 24-pp catalog describes company's glass block and its functions, and lists various glass block patterns manufactured, including light and solar heat controlling blocks, with details on functional advantages of each specific pattern. Included are instructions and construction details for both large and small-size panel installations in steel, wood frame, brick or brick veneer construction. Table of dimensions; a section on how to calculate illumination and brightness; and tables on solar heat control and fuel savings included. Owens-Illinois Glass Co.

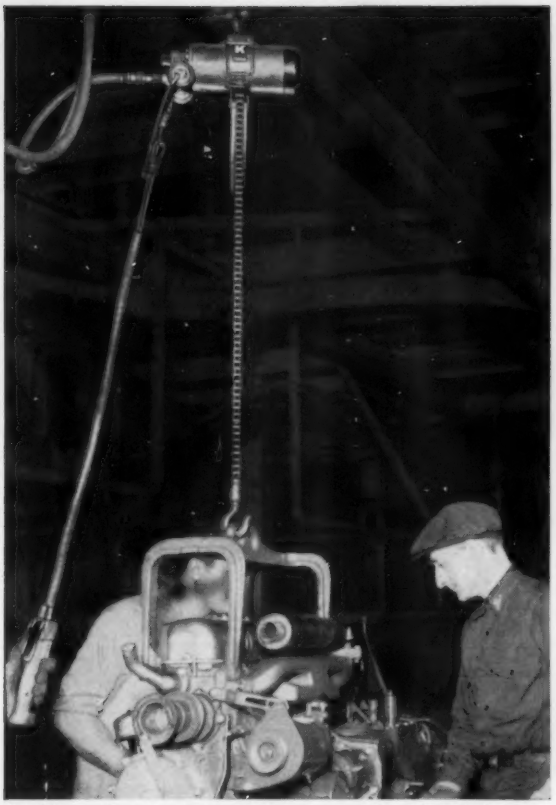
378 **Fiberglass Reinforced Panels**—This file of bulletins covers fiberglass-reinforced panels for a wider range of industrial glazing jobs. Data is provided on shatterproof panes, Fire-Snuf panels, and metal-reinforced security panels. Strength test reports and physical data as well as information on light transmission qualities are included. Resolite Corp.

379 **Corrugated Panels, Flat Panes**—Folder IC95R features company's flat panes and corrugated translucent fiberglas panels for varied industrial use. Contains full information on the first scientifically engineered fiberglas flat panes for glazing, with suggested construction details for metal-covered buildings and double-pitched skylights. Illustrations show typical industrial installations. Alsynite Co. of America.

380 **Window Modernization**—How to modernize old windows with company's glass blocks is told in 8-pp Bulletin GB-104. Selection data is included, along with photos of typical installations. Pittsburgh Corning Corp.

381 **Data on Panel Material**—This 12-pp booklet is a new edition of a guide to the use of Presdwood. Generously illustrated with drawings and photos, it describes basic and special Presdwood products and their properties, tabulates available sizes, describes working and finishing methods, and illustrates various finishes. Masonite Corp.

382 **For Stairway Construction**—This 12-pp illustrated booklet describes the use of this company's Junior channels in stairway construction. Provides specifications and shows some of the buildings in which the channels have



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86-2V10	1000 lb.	35 f.p.m.	78 lb.
86-1V10	1000 lb.	19 f.p.m.	28 lb.
86-1V10L*	1000 lb.	19 f.p.m.	28 lb.
86-1V5A	500 lb.	35 f.p.m.	28 lb.
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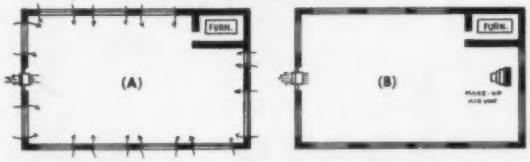

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DATA FILE

(Begins on page 246)

been used as stair stringers. Tables give size and weights, and show allowable loads. Jones & Laughlin Steel Corp.

383 **Non-Slip Flooring**—Algrip, an abrasive rolled steel floor plate described as non-slip even on steep inclines, is the subject of Booklet AL-29, 8 pp. Discusses safety features; gives fabricating data. Alan Wood Steel Co.

384 **Floor Surface Hardener**—Bulletin SH56 describes preparation of Emeri-Topcrete, a hard surface flooring made with company's Type SH Cortland Emery aggregate. Includes recommended specifications and estimating data. Materials, mixing, application and curing information is given. Walter Maguire Co., Inc.

Postage-free Reader Service Cards make it easy to order catalogs. Cards are provided on pages 241 and 242.

385 **Steel Grating and Treads**—Bulletin 2486, 16-pp, describes types, sizes and load characteristics of company's line of electroforged steel and interlocked aluminum grating and treads. Points out advantages in design and construction resulting in greater safety, pictures applications. Blaw-Knox Co.

386 **Metal Grating Handbook** — Sixteen-pp Form 500 is data and specification manual covering all types of grating, open steel floor armor, stair treads, vessel liners, decking and drain grates. Contains safe load tables for basic types of gratings, panel width constant charts, tables on standard widths and types of steel treads, types of anchors used for grating. Klemp Metal Grating Corp.

387 **Air Tools, Paving Breakers**—These two bulletins describe company's latest models of paving breakers and air tools for plant construction and maintenance work. Bulletin PB1 gives features and specifications on heavy-duty, medium-weight and lightweight paving breakers, as well as tools for use with them. Bulletin ST-100 describes and gives specifications for clay spaders, trench diggers and backfill tampers. Gardner-Denver Co.

WIRE ROPE

388 **Industrial Wire Rope**—Bulletin DH-128D, 24 pp, features wire rope recommendations for industrial services. Covers more than 120 types of wire ropes used in construction, conveyors, cranes, dredges, steel mill and blast furnaces, coal bridges, guy ropes, inclines, platform lift trucks and winch lines. Each recommendation covers such points as rope diameters, construction, preforming, lay, grade and core. In addition, charts covering weights and breaking strengths are provided. American Cable Div., American Chain & Cable Co., Inc.

389 **Wire Rope Assemblies**—Catalog 5201, 22-pp, describes company's wire rope assemblies, used for operating controls, as a part of machinery and equipment, or for slings and hoists. Gives general applications for various types of wire rope assemblies. Macwhyte Co.

TOOLS, WELDING, AND MACHINE SHOP EQUIPMENT

390 **Data for the Shop**—"Fluids and Facts for Metal Working" is a pocket-size booklet of about 44 pp. A section on metal working fluids covers their function and selection, preparation and use of soluble oils and paste compounds, and prevention of dermatitis. A section on metal working facts gives conversion tables, steel numbering systems, machinability ratings of metals, drill grinding charts, twist drill sizes and other data. Standard Oil Co. (Ind.)

391 **Portable Electric Tools**—This standard catalog, Form 10, 24 pp, features portable electric tools, including electric drills, bench-drill stands, hole saws, buffing and polishing kits, sanders, polishers, grinders, hammers, saw blades, vacuum cleaners, and others. Photos included. The Black & Decker Mfg. Co.

392 **Pipe Tool Ordering Guide** — Catalog 2-51, 8 pp, covers company's line of threaders, cutters, vises, dies, tongs and wrenches; gives prices. Armstrong Bros. Tool Co.

393 **On Spot Welding**—"Spot Welding from One Side—With a Portable Gun," 12-pp, describes an inert-gas-shielded tungsten-arc spot welding process. Over 30 tables, weld cross-section and application photos, drawings and graphs are included. Sections of text cover when to consider spot welding from one side, how the equipment operates, standards and test procedures, factors affecting weld. Air Reduction Sales Co., Div., Air Reduction Co., Inc.

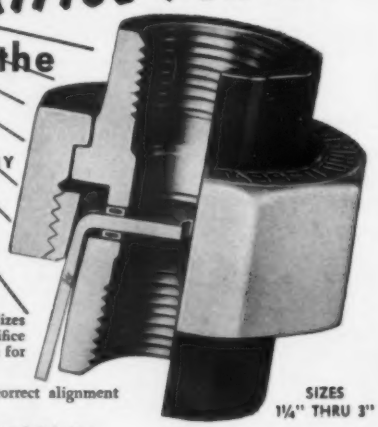
394 **Where to Use Your Stud Driver**—Twenty-pp pocket-size Form 955 describes and pictures applications of studs, using company's Model 450 stud driver. Provides some operating hints and safety precautions and covers use of studs through steel into concrete, wood into concrete, wood into steel and steel into steel, as well as their use for attachment of pre-drilled fixtures. Remington Arms Co., Inc.

MAINTENANCE

395 **Basic-Roofing Information**—"What You Should Know About Your Roof" is a 40-pp clearly illustrated booklet which tells what makes a roof fail, how to recognize signs of roof deterioration, what to do to keep a roof in good condition. Discusses recommended roofing practices, essentials of a good re-roofing job. Johns-Manville.

396 **Building Maintenance** — Handbook 7 offers 64 pp of information on floor surfacing, leak stoppers, external wall sealants, roadpatching, roofing materials. Includes instruction for applying them. Flexrock Co.

a MERE GLANCE gives the FASTEST CHECK of ORIFICE PLATES when you install the NEW CLAYTON MARK & COMPANY TABBED ORIFICE UNIONS



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PUMP NEWS!

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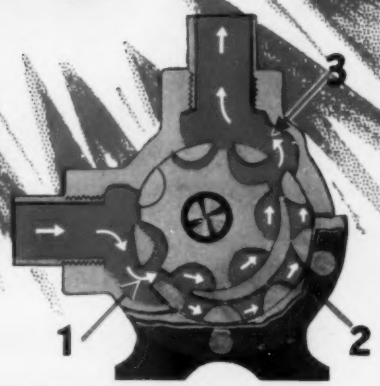

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DATA FILE

(Begins on page 246)

397 **Hot-Dip Galvanizing**—How hot-dip galvanizing is prolonging life of industrial equipment is stressed in this 16-pp booklet. Photos, showing galvanized equipment in use accompany brief text explaining how this process of covering iron and steel with a protective coating of zinc serves to prevent rust. The galvanizing procedure is explained and illustrated. Coating comparison charts show how hot-dip galvanizing compares with other types of coatings as to rust resistance, dimension limits, shock resistance. American Hot-Dip Galvanizers Assn., Inc.

398 **On Rust Prevention**—This 1956 General Catalog, 38-pp Form 255, presents a treatise on rust prevention with illustrations of Rust-Oleum uses and applications throughout industry. Included are 102 color chips showing variety of colors available in primers, short oil type coatings, oil field finishes, restful color group finishes, machinery and implement colors, long oil type coatings, calvinoleum coatings, heat resistant coatings, chemical resistant coatings. Rust-Oleum Corp.

399 **Protective Paint**—Thirty-five case histories of successful use of protective coatings based on chlorinated rubber are included in this 20-pp bulletin, "Protection With Parlon." Photos show water and sewage works, paper mills, storage tanks, and chemical and food processing plants where these coatings have had long-term exposure to corrosive environments. Includes performance data, instructions for application. Hercules Powder Co.

400 **Insulation Coating**—This 32-pp illustrated handbook, Form L-17, presents the advantages of company's NoDrip insulation coating for preventing condensation drip from metal, concrete, brick, wood, plaster or composition surfaces. Lists applications and describes methods of applying. Contains tabulated data on quantity required to cover various size tanks and pipe. J. W. Mortell Co.

401 **Coatings for Insulation** — Manual 545, 20 pp, is a revised reference manual on adhesives, sealers, vapor barriers, surface coatings for use with insulation. Gives technical product data, application specifications. Includes handy reference chart covering 31 products, giving information on uses, application, and drying time. Benjamin Foster Co.

402 **Repairing Concrete Floors** — A seven-step procedure for repairing concrete floors with non-shrink mortar is described in this folder, EPMM-4. Each step is illustrated with an actual photo and description of step involved. Strength comparisons between plain mortar and non-shrink pre-mixed mortar are given. The Master Builders Co.

403 **For Fast Floor Repairing** — This illustrated bulletin covers Kwik-Roc, a fast and tough hardening material for repairing holes and cracks in concrete floors. Tells how to prepare surfaces for Kwik-Roc, how to mix, place, and store it. Includes service recommendations. A. C. Horn Co., Inc.

404 **Better Floor Care** — This illustrated folder describes products designed to aid efficient floor care. Lists combination Scrubber-Vac machines, conventional scrubbing-polishing machines, steel-wool pads, applicators, vacuum cleaners, mop trucks and other mopping equipment. Included are waxes, sealers and cleansers. Finnell Systems, Inc.

405 **Industrial Vacuum Cleaning** — Twelve-pp Bulletin 155 B describes both stationary vacuum cleaning equipment and portable industrial vacuum cleaners, the latter in both light- and heavy-duty types. Recent improvements in collection and dumping methods are covered, and photos show application to conveying, reclaiming, bench work and removal of water. Specifications and ratings are included. Spencer Turbine Co.

406 **Light Scaffolds** — This series of illustrated bulletins describes company's line of aluminum alloy Up-right scaffolds and accessories. Pictures one-piece sections and multi-section models with various ranges of adjustability. Points out such features as locking hooks which provide automatic security and locking casters for safety on stairways and inclines. Up-Right Scaffolds Div., Up-Right, Inc.

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DATA FILE

(Begins on page 246)

DUST CONTROL AND AIR CONDITIONING

407 **Dust Control, Blast Cleaning**—Bulletin 1210, 24 pp, fully illustrated, describes manufacturer's line of blast cleaning and dust control equipment, accessories. It is indexed according to equipment, type and purpose. Lists three methods of application. Pangborn Corp.

408 **Dust Control**—"Engineered Efficiency in Dust Collection and Recovery," 36 pp, discusses industrial dust recovery from standpoint of nuisance abatement, waste avoidance, hazard elimination. Shows effect of variation in particle size, distribution and specific gravity of dust on efficiency of the dust collecting system. Buell Engineering Co., Inc.

409 **Flexible Hose**—A set of five bulletins (Nos. 40 through 44) are of interest to plant engineers concerned with the design, installation or purchase of flexible hose for dust and fume control, air conditioning and materials handling. They provide general information, data on installation, application suggestions, technical data and prices on hose, duct and accessories. The Flexaust Co.

410 **Air Conditioning Filters**—Bulletin 600, 8 pp, describes company's Staynew ventilation and air conditioning filters. Specifications, engineering, performance and installation data covering dry type panel filters for the removal of air-borne impurities given. Dollinger Corp.

411 **Dust Control Systems**—Valuable engineering data on methods of dust control as well as descriptions of company's line of dust collectors are contained in illustrated Bulletin 636-2. Specifications on all models are included. A special section tells how to design your own system. Aget Mfg. Co.

412 **Dust Collectors**—Operation, construction, versatility and maintenance of company's unit dust collectors are explained in this bulletin. Includes capacities, sizes. The Kirk & Blum Mfg. Co.

413 **Tubing for Many Jobs**—Flexible tubing for ventilation, fume and dust removal as well as materials handling is described in 8-pp Catalog C2-4. Gives detailed information on company's Spiratube A and Spiratube R, two types of lightweight tubing made from continuous helical coils of spring wire wound with fabric. Gives uses. Flexible Tubing Corp.

414 **Dust Collectors**—Various models of company's Multi-Wash dust collectors are featured in this interesting file of bulletins. In each case, bulletin describes performance characteristics and points out advantages, with a cutaway photo of the unit showing internal features. Capacities, dimensions and approximate weights are tabulated. Claude B. Schneible Co.

415 **Dust Collector**—Bulletin 556 describes such outstanding features as efficiency and ease of maintenance of company's Hydro-Filter dust collector. Construction and design details are illustrated with cutaway view of unit, and dimensional and capacity data are given. National Dust Collector Corp.

FANS, VENTILATING

416 **Induced Draft Fans**—Eight-pp Bulletin D B-32-53 provides engineering information on manufacturer's Bifurcator fans for providing controlled draft for boilers and furnaces. Gives construction details, sizes. Illustrated with photos, diagrams of suggested methods for installation. DeBothezat Fans Div., American Machine and Metals, Inc.

417 **Roof Ventilators**—**Sixteen-pp Bulletin** A-112, revised, covers manufacturer's line of roof ventilators. Provides information on a reversible roof ventilator, also penthouse Vertijet, rotary and other models. Sizes, specifications, performance data and dimensional drawings are included. Hartzell Propeller Fan Co.

418 **On Ventilating Systems**—**Design** and engineering data on company's line of ventilating fans and blowers are presented in 32-pp Bulletin 310. Includes table showing air change requirements of various types of rooms and areas, discusses details of fan operation and design, the use of ducts, special conditions which govern fan selection, design and operation of blowers. A section on how to design systems is included. Ilg Electric Ventilating Co.

419 **Industrial Fans**—Bulletin 702A features company's line of fan equipment for industrial air and material handling applications. Photos illustrate various types available, and complete descriptive detail and a table of general data are included. Clarage Fan Co.

MATERIALS HANDLING

420 **Cranes for Big Jobs**—A new 1½-yard shovel, 35-ton crane is described in this 6-pp catalog. Action pictures of the machine in quarries and gravel plants are included, also specifications. American Hoist & Derrick Co.

421 **Electric Hoists**—Twelve-pp Bulletin DH 133B describes Speedway electric hoists of 500-to 4000-lb capacities. Fully illustrates and explains design features and gives details on suspensions and conducting systems. Clearance data, specifications included. Wright Hoist Div., American Chain & Cable Co., Inc.

422 **Electric Hoist Manual**—Catalog 215-B offers 38 pp of engineering, application and ordering information on company's Load-Lifter electric hoists. Presents hoists with hand operated trolleys and with power travel, hoists with lug suspension, hook suspension and push-type trolleys, and with hand-geared trolleys. Manning, Maxwell & Moore, Inc.

423 **Overhead Cranes**—Bulletin T202, 20 pp, gives full information on top running double girder cranes with top running trolley in capacities from 2 to 12 tons, spans to 60 ft. Data is also given on top running single girder cranes, both motor driven bridge types and head geared or push type in capacities from 1 to 10 tons, spans to 50 ft. Features which contribute to efficient operation and low maintenance costs are detailed. Electrical information included. Chicago Tramrail Corp.

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DATA FILE

(Begins on page 246)

424 **Overhead Handling System**—Engineering and application data on overhead handling equipment is presented in 12-pp Bulletin 2008-L. Describes stresses developed in various type tracks used for overhead handling systems. Problem of track peening and its solution is also covered. Data is given on principal components of system. Cleveland Tramrail Div., The Cleveland Crane & Engineering Co.

425 **How to Choose a Crane**—Designed to aid in the selection of overhead cranes, 8-pp Unit 79 shows how to analyze handling problems, decide on the type of crane desired and draw up specifications for crane proposals. Basic data is provided on classes of crane service, crane ratings and capacities and recommended speeds for bridge, trolley and hoist, along with standard dimensions and clearances. Gives 14 safety features. Whiting Corp.

426 **Crane and Hoist Parts** — Bulletin G8 covers company's line of hoist grabs as well as component parts for various type cranes. Includes photos and drawings of the parts, along with descriptions and specifications. Downs Crane & Hoist Co.

427 **Floor Cranes** — Major models of this manufacturer's hydraulic floor cranes are described and pictured in the 8-pp bulletin. Shows cranes from 1000- to 6000-lb capacities, giving applications and features. Ruger Equipment, Inc.

428 **Continuous Power Conveyor** — Sixteen-pp Catalog A-96 describes a packaged overhead conveyor for light duty applications. This complete basic "package" contains drive unit, take-up, oiler and other items essential for a 50-ft system. Describes power drive unit, track, power chain and other components and discusses lubrication and chain safeguards. Suggested layouts are diagrammed, and some installations shown. Richards-Wilcox Mfg. Co.

"Overloaded!"

429 **Trolley Conveyors**—Continuous overhead conveyor systems are featured in profusely illustrated, 132-pp Catalog 50. Describes outstanding advantages such as adaptability, self-programming operation, automatic timing, space saving storage, adequate supply of parts, worker conservation, assembly on the conveyor and others. Dimensions and data on various types of trolley and attachments are given. Jervis B. Webb Co.

430 **Materials Handling Methods** — Bulletin 552, 16-pp, illustrates 48 manhour and space-saving handling operations, and shows various material handling equipment at work in many industries. Shows how properly selected equipment gets more work done and reduces costs by making handling jobs easier. Describes general materials handling movements, motor truck loading and unloading, storing goods and materials ceiling high, handling skids and pallets with same truck. Barrett-Cravens Co.

431 **Engineered Conveyors**—Bulletin 156, 8 pp, discusses design and performance of company's material handling and production systems, engineered to solve specific problems in the handling and production of various materials. Covers overhead conveyors, ultra time and synchronized conveyors, trans-free conveyors. Allied Steel and Conveyors Div., The Sparks-Withington Co.

432 **Steel Conveyor Belts**—"A profitable approach to the selection of steel processing conveyor belts" is the subject of this 16-pp bulletin. Simplfied selection, standard specifications, and installation information are included. Photos and diagrams illustrate the text. The Colorado Fuel and Iron Corp.

433 **Engineered Conveyor Systems**—Catalog 853, 32 pp, illustrates conveyor systems in use in a wide range of industries, showing how they suit handling requirements involved. Roller, wheel, belt, chain, overhead trolley and elevating conveyors are included, also spirals, portable power conveyors, ball transfers and special equipment. Mathews Conveyer Co.

434 **Fork Truck Efficiency Test**—This 8-pp article explains how to tell when fork trucks need corrective measures. Lists equipment and facilities necessary for truck testing, tells how to test traveling efficiency and hoist speed measurements, shows suggested test data forms. Mercury Mfg. Co.

435 **Electric Fork Trucks**—Two electric fork trucks designed for high maneuverability, ease of maintenance, and operator comfort and convenience are introduced in two 6-pp bulletins. Bulletin 1324 covers a 4000-lb. capacity model; Bulletin 1325, a 6000-lb. truck. Performance specifications, dimensions, details on controls and construction are given, features explained, and attachments shown. Baker-Raulang Co.

436 **Lift Truck Work Kit**—A method of predetermining the time necessary for fork lift trucks to perform specific operations is provided in this work kit, designed to enable plant engineers to apply fork lift truck standard performance data. It can assist in determining efficiency of fork lift trucks now in use as well

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BY THE TON

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These new powerful, guaranteed-permanent Alnico V Magnets are designed for efficient, low-cost application in every industry where product purity is essential, and where tramp iron or iron of abrasion can damage processing equipment or create fire hazards.

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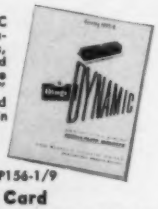
New Dings DYNAMIC Perma-Plates available in 4 basic types, with 35 standard sizes in each type from 4" thru 72" wide. You'll find complete details in Catalog 1205-D.



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Outlasts and outwears plain cement-sand patches because . . .

- *Does not shrink* upon hardening.
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- Higher compressive and impact-resistant strength.
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RUST-PROOFED . . . by zinc plating, Darnell Casters give longer, care-free life wherever water, steam and corroding chemicals are freely used.

LUBRICATION . . . all swivel and wheel bearings are factory packed with a high quality grease that "stands up" under attack by heat and water. Quick grease-gun lubrication provides easy maintenance.

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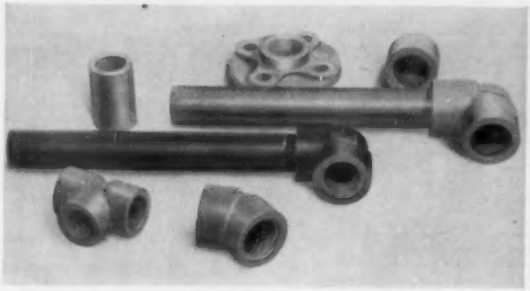
new PIPING ECONOMY for handling corrosives



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● Here is a new Carpenter service to help processing plants cut piping costs for handling a wide variety of corrosives under moderate operating temperature and pressure conditions. Carpenter PVC Plastic Pipe and Fittings are admirably suited for such piping requirements because of the excellent corrosion resistance, strength and other desirable properties of the unplasticized polyvinyl chloride from which they are made. They withstand both oxidizing and reducing conditions. For this reason, Carpenter PVC Pipe and Fittings supplement other corrosion-resistant piping materials previously made available by Carpenter research and production advances in stainless and specialty steels.

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Easily and economically installed with usual piping tools, Carpenter PVC Pipe and Fittings assure trouble-free service with cost economy. Why not look into the advantages of using Carpenter PVC Piping systems in your plant? Consult your nearby Carpenter Distributor or Representative and ask for new Technical Bulletin T.D. 119.

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Carpenter

PVC Pipe and Fittings

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DATA FILE

(Begins on page 246)

as in planning for future needs. Includes typical materials handling examples to show technique for application of the data, as well as charts providing times for basic truck motion elements. The Yale & Towne Mfg. Co.

438 **Railroad Car Spotter**—Book 2092 describes a car spotter with which one man can easily spot six loaded railroad cars at one time —or handle scores of other tasks involving horizontal haulage in either direction or around corners. This spotter consists of a vertical capstan, helical and worm gear drive, housing and integral motor. Engineering information, instructions for calculating rope pulls and typical layouts for both car spotters and car pullers are provided. Link-Belt Co.

439 **Oil-Hydraulic Lifts**—Catalog RE-203, 20 pp, covers the field of heavy-duty oil-hydraulic lifting devices for industrial applications. Featured in catalog are company's standard Levelator lifts, a 6000 lb single-jack model and a 12,000 lb dual-jack lift. Also featured is an electric pump mounted on an oil tank for powering oil-hydraulic devices. Illustrates lift platforms, platform accessories and safety devices, jacks, power units. Rotary Lift Co.

440 **Casters and Wheels**—Catalog 138 is a 191-pp product manual on company's line of casters and wheels, describing design features and listing full specifications. Photos and drawings are used profusely to illustrate data, covering furniture casters, wheels, glides, desk shoes and various accessories. Darnell Corp.

441 **Shock Absorbing Casters**—Twenty-pp Catalog FH-53 describes construction features of company's Floating-Hub casters, listing types and mountings now available. Load ratings for each type and size are provided. Stresses, by text and illustration, how these shock absorbing casters work, permit smooth travel over rough floors. The Bassick Co.

STORAGE EQUIPMENT

442 **Storage Equipment — Catalog** 100-E, 72-pp, illustrates and describes company's complete line of steel cabinets, folding chairs, chests and safes, stools, tool boxes, work benches, tool stands, shelving, tool storage, lockers, coat racks, filing cabinets, revolving bins, others. Includes dimensions and other specifications. Photos illustrate some typical equipment installations. Lyon Metal Products, Inc.

443 **Adjustable Shelving**—How this shelving can save assembly time is explained in 28-pp Form 2111. Photos and drawings of various types of shelving units, including open and closed shelving, bin units, ledge shelving, counter shelving, cabinets with swinging and sliding doors, parts and accessories are included, along with specifications. Standard Pressed Steel Co.

444 **Steel Lockers**—Catalog L-100A, 20 pp, features a complete line of steel lockers designed for safer storage, longer life and better housekeeping. Contains descriptions, illustrations and specifications for various types of units and storage combinations to suit a variety of different installations. Penco Metal Products Div., Alan Wood Steel Co.

445 **Storage Shelving** — Rapid erection, strength and other advantages of manufacturer's storage shelving are stressed in this illustrated bulletin. Shows component parts, open types, closed types and some of the many combinations of dividers, bins, doors available. Also presents tool inserts, other shop equipment. DeLuxe Metal Furniture Co.

INSTRUMENTS, CONTROLS

446 **Automatic Controls — Mercury - switch** equipped controls for heating, refrigeration, air conditioning and other industrial uses are presented in 52-pp Catalog 856. Fully illustrated, book provides ordering and application information on a variety of pressure controls, temperature controls, level controls, limit and fan controls, and many others. Also presents data on relays, and on tilting-type and magnet-operated mercury switches. The Mercoid Corp.

447 **Versatile Electronics**—How flexibility of electronic temperature controls makes them useful in a wide range of heating and air conditioning installations is explained in this 16-pp booklet, Bulletin SA-2681. Purpose of publication is to fill the gap between the theory of electronic bridge circuits and specific control layouts and circuit diagrams. Four basic features that give electronic control its flexibility and application to a wide variety of installations are described. Minneapolis-Honeywell Regulator Co.

448 **Service Regulators** — Revised Bulletin 1026, 20-pp features company's line of service regulators. Rate-of-flow graphs illustrate mathematically the determination of maximum outlet pressure build-up and amount of gas relieved to atmosphere by extra safety device in case of failure of regulator. Rockwell Mfg. Co.

449 **Thermal Controls** — Descriptive and basic technical data on company's Thermoswitch controls are presented in 16-pp condensed Catalog 500. Products listed include the following types of controls: standard line, differential expansion; liquid filled snap-action, midget and miniature differential expansion; indicating controllers, bulb and capillary, and electronic. Fenwal, Inc.

450 **Combustion Controls**—Included in this catalog (about 16 pp) are product descriptions of company's combustion instruments and controls. Covers damper controls; drive units; draft, air pressure and flue temperature gages; steam controls; panel board cabinets; low-draft cut-off switches. Pages are fully illustrated to show design and operational details, and brief text includes application suggestions, special features. An oil burning manual of information is included with this catalog. Cleveland Fuel Equipment Co.

451 **Temperature Controls**—Eight-pp Catalog CC, on temperature controls and allied equipment for heating and refrigeration, provides information on recording, indicating, non-indicating controls; thermometers; bulb installation accessories; process timers, and gas pilots. Includes prices and references to detailed literature. The Partlow Corp.

INSTANT SETTING FLOOR PATCH

Repair broken factory floors without the usual traffic tie-up. Simply shovel INSTANT-USE into the hole or rut — tamp smooth — truck over! No waiting! INSTANT-USE bonds tight to old concrete — right up to a feather edge. It's tough. Wears like iron. Won't crack or crumble. Install complete overlay where floors are badly chewed up. Used indoors or out. Immediate shipment.

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161 MODELS TO CHOOSE FROM

Now you can custom design your own layout with Equipto modern-flow Benches. They can be easily arranged into one continuous streamlined assembly.

Many types and styles of drawers, drawer pedestals, cabinet pedestals, sliding doors, aerial shelves and accessories are available for Equipto Benches.

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Send for big 16 page catalog No. 200 illustrating and describing this outstanding line of top quality benches.

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Other models are available in capacities to three tons in floor cranes, two tons in truck cranes.

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Then, the Adams Separator creates a cyclone to efficiently remove the condensate . . . giving you cooler drier air for your system.

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DATA FILE

(Begins on page 246)

452 Control Relay—Eight-pp Bulletin PL 7305-PM describes company's line of control relays, designed to occupy minimum panel space, and available in models with from two to 12 poles. Pictures 10 models, gives dimensions, enclosures, features, and data on maintenance and pole conversion from normally-open to normally-closed; and lists literature and template kits available. Clark Controller Co.

453 Overheat Protection—Bulletin MOPR-1, 8 pp, describes design and operation features of inherent overheat protectors—small devices built into electric motors to turn power off when windings get too hot. Includes photos and wiring diagrams illustrating operation. Metals & Controls Corp.

454 For Limited Panel Space—Bulletin 532 describes Model 216 indicator used with company's automatic tank contents gage. Bulletin contains a full illustration of indicator which, although occupying a small space, has a scale length of 20 in. Also included is a description of operation of gaging system and mounting dimensions. The Liquidometer Co.

455 For Industrial Metering—Practical selection and application data on meters for industrial liquids are provided in 20-pp Form 566. Explains value of metering in batch mixing, process and cost control. Illustrated charts show how to select proper meter according to type, temperature and flow rate of liquid to be metered, and include specifications for models shown. Strainers, valves and other accessories are described. Neptune Meter Co.

456 Contour Projectors—The use of projection or optical gaging with company's contour projectors is discussed in this illustrated bulletin. Points out chief advantages and describes typical applications. Specifications and dimensional diagrams for a number of models are included. Eastman Kodak Co.

457 Television Equipment—Twenty basic applications for "TV Eye" low-cost closed circuit television equipment are described and pictured in Form 3R2335. Folder explains equipment's functions and operation, lists specifications. Radio Corp. of America.

VIBRATION CONTROL

458 How to Cut Vibration—The use of Vibra-Mount felt in reducing machine vibration and accompanying noise is covered in this 20-pp illustrated booklet. Tells where this shock-absorbing felt is used effectively, how to select the proper mount, and how to install it. Cost information is provided, other felt products are listed. American Felt Co.

459 Vibration, Noise Control—Bulletin K6A, designed as a plant engineer's guide to machinery mounting, vibration and noise control, discusses such problems as: machine mobility, eliminating floor bolts; leveling machines; eliminating rejects. Shows by means of case histories how these problems are solved by such isolation media as steel springs, cork, and rubber. An insert section features selector chart telling cost of mountings for 215 commonly used open back inclinable punch presses. The Korfund Co., Inc.

PUMPS, COMPRESSORS

460 For Hazardous Liquids—Catalog Section D, 12 pp, presents company's line of Underwriter rotary pumps for hazardous liquids. Both mechanical seal and deep stuffing box models are shown and dimensions and specifications provided. Various mounting arrangements and drives available for these UL approved pumps are also cataloged, and application suggestions are given. Also in this booklet are performance graphs. Viking Pump Co.

461 Condensed Pump Data—Form 4383-J covers more than 20 types of general service pumps, rotary pumps, sump and drainage pumps, condensate units, self-priming units, stainless steel pumps and high-pressure pumps. In easy-to-find tabular form, each model is pictured along with its characteristics, applications and features. Goulds Pumps, Inc.

462 Solids Handling—Bulletin 121-A, 8-pp, describes non-clog pumps for handling solids in suspension. Included are vertical, horizontal and close-coupled types used to handle liquid components of industrial processes, industrial waste, and for such pumping applications as water supply, drainage and sewage handling. Specifications are included. Aurora Pump Div., The New York Air Brake Co.

On pages 241-242 are two postage-free Reader Service Cards provided for your convenience in ordering these catalogs. You may also use the cards to order any literature mentioned in ads.

463 Wet Pit Pumps—Sixteen-pp Catalog 3007 covers heavy-duty pumps for drainage, flood water, effluent boiler blow-off, hot wells, acids and alkalis. Illustrations, tables and text give design features of these wet pit pumps. Catalog also includes a condensed version of the Standards of Hydraulic Institute data section listing metals used in constructing pumps for handling various liquids. Also suggests factors to be considered in pump selection. Yeomans Brothers Co.

464 Steam Pump—Bulletin 230 describes a horizontal duplex steam pump with piston valve steam chest. Explains advantages of this construction, including high recovery of fuel cost when exhaust steam is utilized. Provides sectional and exterior views of the pump, also specifications, capacities and dimensions. Warren Steam Pump Co., Inc.

465 Air Compressors—Catalog C-100, 30 pp, features comprehensive descriptive and engi-

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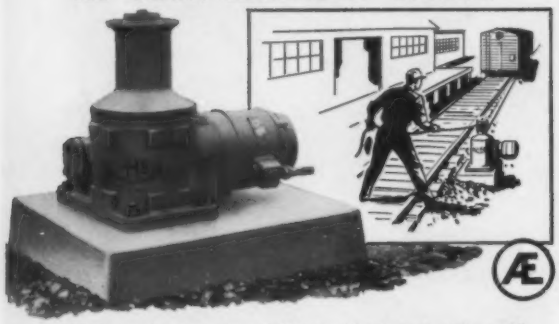

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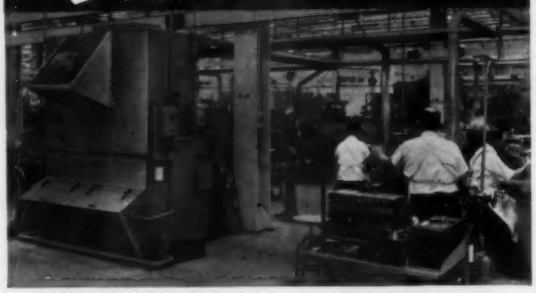

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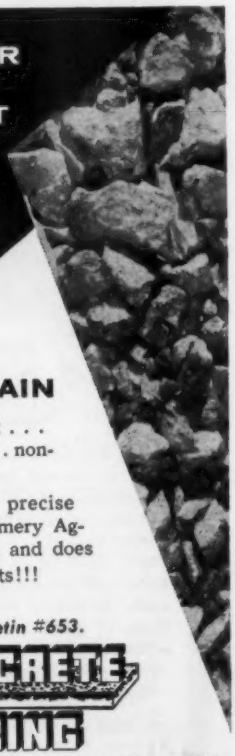

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(Begins on page 246)

neering detail on company's line of air compressors, including electrical specification codes and instructions for ordering. Large cutaway view illustrates component features and tables list complete specification data. Distinctive design features are illustrated with cutaway photos and diagrams, and selection data is included. Curtis Pneumatic Machinery Div., Curtis Mfg. Co.

466 Compressor Data — Feather valve compressors from 75 to 350 hp are described in 32-pp Bulletin L-676-B1A. Advantages on installation, operation and maintenance costs are outlined for types YC and DYC compressors. Information and illustrations are offered on component parts, including frame, running gear parts, intercooler, crosshead, motor and main bearings and various cut-away views are included. Variable capacity control information is listed along with data on governors. Diagram illustrates correct selection and coordination of auxiliary equipment. Worthington Corp.

467 Compressors — Bulletin A72, 36 pp, gives construction, operation information on company's Class WN-114 heavy-duty air compressors. Illustrates seven models of compressor as a single unit for displacement capacities from 1186 to 1948 cfm, twin units furnishing up to 3896 cfm. Joy Mfg. Co.

468 Portable Compressors—Twelve-pp Catalog GG-9A pictures 40 models of company's portable type compressors. A quick reference chart shows capacities, engine types, and mountings available. Illustrates such features as: replaceable cylinder sleeves, interchangeable valve parts, aircraft type compressor cylinders, heavy duty industrial type engines, and magneto ignition on all gasoline models. Le Roi Div., Westinghouse Air Brake Co.

469 For On-the-Spot Air — Eight-pp Form 2302 features company's self-contained Spot-Air portable compressor. Deals with the many tools it will operate, with actual on-the-job illustrations pointing out added advantages of this light-weight compressor on jobs where bigger compressors are not needed. Ingersoll-Rand Co.

470 Gas-Engine Driven Compressors — A two-cycle turbocharged compressor is described in 24-pp Bulletin 134. Stresses economy of installation and operation afforded by this gas-engine driven unit, lists other advantages. Explains how turbocharging saves on fuel and cooling. Design and construction features are discussed. Clark Bros. Co.

BOILERS, GENERATORS

471 Packaged Boilers—This 16-pp illustrated catalog describes manufacturer's new Type VP Package boiler. Following a section of background information is an outline of principal design features of these boilers, which are shop assembled and provide steam capacities from 4000 to 40,000 lb per hour. Space requirements are shown in a table along with specifications. Combustion Engineering, Inc.

472 Steel Boilers—Revised General Catalog 80, 32 pp, is a condensed but complete product guide on company's high and low pressure steel boilers. Also included are full descriptions and illustrations of water heating products, both direct fired and storage types as well as indirect water heating coils. Pages on boiler support brackets, structural steel suspension and induced draft fans, as well as pictures of installations are included. Kewanee-Ross Corp.

473 Self-Contained Boilers — Bulletin AD-144 reviews company's new CB boilers. Illustrations include installations, demonstrations. Engineering articles are featured covering such subjects as low noise level. Cleaver-Brooks Co.

474 Standard Generators—Bulletin B-55-4 describes company's SC economy series of standard steam generators designed to reduce steam costs for industrial plants. Pre-engineered, standardized steam generators offered in nine sizes, with capacities of from 50,000 to 150,000 lb per hour are described, and schematic and cutaway drawings of the units and design features are included. Foster Wheeler Corp.

475 Water Tube Boilers—This 12-pp bulletin describes and illustrates various types of water tube boilers and auxiliaries, including water cooled furnaces, superheaters, economizers, air preheaters, and steam washers. Also contains diagrams, tables, and boiler data. Edge Moor Iron Works, Inc. Div. of Condenser Service & Engineering Co., Inc.

OTHER EQUIPMENT

476 Finishing Systems—Illustrated Catalog A-653, 12 pp, describes complete finishing systems for porcelain and synthetic enamel, lacquer, paint, and other finishing. Also covers a variety of other industrial equipment including ovens, dust collectors. The R. C. Mahon Co.

477 Neoprene Design Book—This illustrated bulletin discusses the properties of Neoprene, showing how they are utilized in products made from this chemical rubber. Covers its toughness, hardness range, air retention, performance under load, at extreme temperatures, flame and chemical resistance. Elastomers Div., E. I. du Pont de Nemours & Co.

478 Steel Reservoirs, Standpipes—This 24-pp booklet pictures installation of reservoirs of 50,000- to 10,000,000-gal capacity, having cone, umbrella or ellipsoidal roofs and ornamental structures with special architectural features. Chicago Bridge & Iron Co.

479 Fighting Corrosion With Corrosion—Cathodic protection against rust and corrosion is the subject discussed in this illustrated 10-pp bulletin. Describes the corrosion battery, corrective measures, cathodic protection battery, and includes design and application data. Electro Rust-Proofing Corp.

480 Glassed Steel Reactors—Bulletin 927, 8-pp, describes glassed steel reactors for processing a wide variety of products under diverse conditions, stressing their versatility as to corrosion resistance, agitation, and temperature-

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pressure range. Standard specifications are tabulated and dimensional diagrams are included. The Pfaudler Co.

481 Industrial Leathers — These illustrated data sheets cover company's leather products and include belting. Also give data on leather packings for hydraulic and pneumatic equipment. J. E. Rhoads & Sons.

482 Detergent Oils—How to clean sludge out of hydraulic and lubrication systems without shutting down machines is told in Technical Bulletin 44. Also tells how continued use of these highly detergent oils keeps equipment as clean as new. Sun Oil Co.

483 Inert Gas Generators—Bulletin IGG-155, 10-pp, describes inert gas generators for protection against fire and explosion. In addition to detailed drawings, photos, capacity and dimension tables, book contains a useful information sheet. Includes an analysis of the work to be done by generators, operating conditions, utilities needed and other data needed for selection. Roots-Connersville Blower Div., Dresser Industries, Inc.

484 Magnetic Selection Guide — Twelve-pp illustrated Catalog C-5000-B, describing manufacturer's entire line of magnetic separators and lifting magnets, serves as handy guide to selection. Dings Magnetic Separator Co.

485 Production Control System, Procedures —Publication X-1268, 56 pp, details a method of material control intended to result in a shorter planning cycle while speeding production by eliminating causes of delay on the production lines. Illustrated with typical forms and charts, book outlines procedures for engineering, production planning and progress, machine load, material and tool procurement and control. Remington Rand Inc.

486 L.P. Gas Fuels—Factors essential to efficient utilization of L.P. gas fuels are discussed in this 20-pp illustrated bulletin. These include responsibility factor, know-how factor, supply factor, quality factor, application factor, construction factor, and continuing service factor. Industrial Div., Skelly Oil Co.

487 Protective Clothing—Catalog 12000, 12 pp, describes and illustrates company's line of industrial clothing for protection against water, fire, acids and alkalis, slipping and scuffing. Various types of work gloves and suits and coats are featured, and protective features and advantages of this equipment are pointed out. The B. F. Goodrich Co.

488 Hydraulic Cylinders — Catalog 200-6, 26-pp, describes company's hydraulic cylinders for die casting, pushing, lifting, holding, pulling, tilting, clamping, pressing, turning, squeezing and other power movements in any direction. Construction features and specifications are detailed, sectional drawing showing component parts is included, as well as dimensional and mounting data. Logansport Machine Co., Inc.

489 Water-Cooled Stoker—Design and operating advantages of the Vibra-grate Stoker are outlined in this illustrated bulletin. A large cutaway view details component parts of the stoker and explains operating features. Other drawings show typical installations. American Engineering Co.

490 Preheating Combustion Air—This well-illustrated 36-pp booklet explains fuel savings and increased performance made possible by using waste heat in flue gases to preheat incoming combustion air. Also covers increased boiler output, ability to use lower grade fuels. Air Preheater Corp.

491 Industrial Filters—How industrial filters can lower production costs is the theme of 10-pp Bulletin 651. Several simple case histories—from filtering city water to the filtering of recirculation water from cooling towers and spray ponds—are cited. Company's new line of IWF filters is featured, including sectional views, typical installation drawings, dimension charts and operational diagrams. Also included are sectional views of the AWF automatic filter, and WFF and WFS series filters. R. P. Adams Co., Inc.

492 Teflon Products — Three bulletins present this company's Teflon packings, gaskets, special parts and stock. Bulletin CP552 describes Chempro lines of Teflon ring packing, Teflon impregnated asbestos packing, V-type packing, and Teflon seal cage—for use with acids and strong chemicals. Bulletin CP553 covers Teflon jacket gaskets, solid ring gaskets, expansion joints and special gaskets. Bulletin CP554 illustrates special parts. Chemical & Power Products, Inc.

493 Feedwater Treatment—Process Bulletin B1, "Treatment of Boiler Feedwater by the Direct, or Internal Method," discusses advantages of direct treatment, as a complete treating program or as a supplement to external systems. Explains why direct treatment is convenient, economical and complete, and points out how it improves steam quality and reduces boiler maintenance costs and downtime. National Aluminate Corp.

494 Synthetic Fluids, Lubricants — Form F-6500D, 52-pp, on synthetics, covers properties, applications, and characteristics of these poly-alkyline-glycol derivatives. Describes uses as mechanical lubricants, hydraulic fluids, rubber and textile lubricants, heat-transfer fluids, anti-foam agents, solvents, and formulation components. Engineering data is presented in the form of tables and charts, and application photos included. Carbide and Carbon Chemicals Co., Div., Union Carbide and Carbon Corp.

495 Corrosion-Proof Materials—Bulletin CC-3, 16-pp, gives basic information on company's corrosion proof construction materials, covering chemical and physical data, estimating data and descriptions of products used for acid proof installations in the metal working, chemical, petroleum, pulp and paper and other industries. Included are sections on corrosion proof cements, tank linings, protective coatings, rigid plastic fabrications and rigid plastic pipe, plus a chart showing their resistance to chemicals. The Atlas Mineral Products Co.

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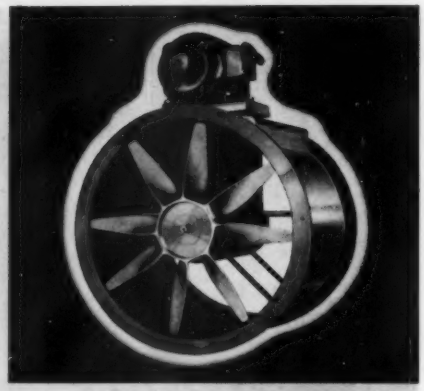

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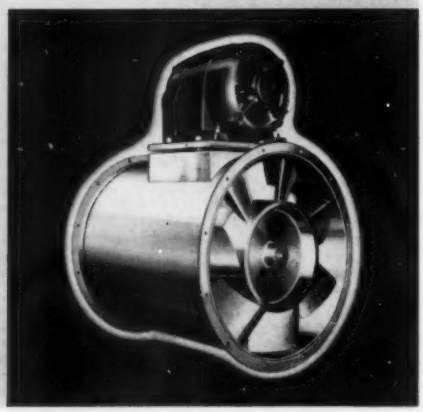

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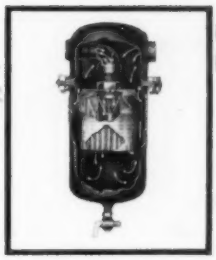

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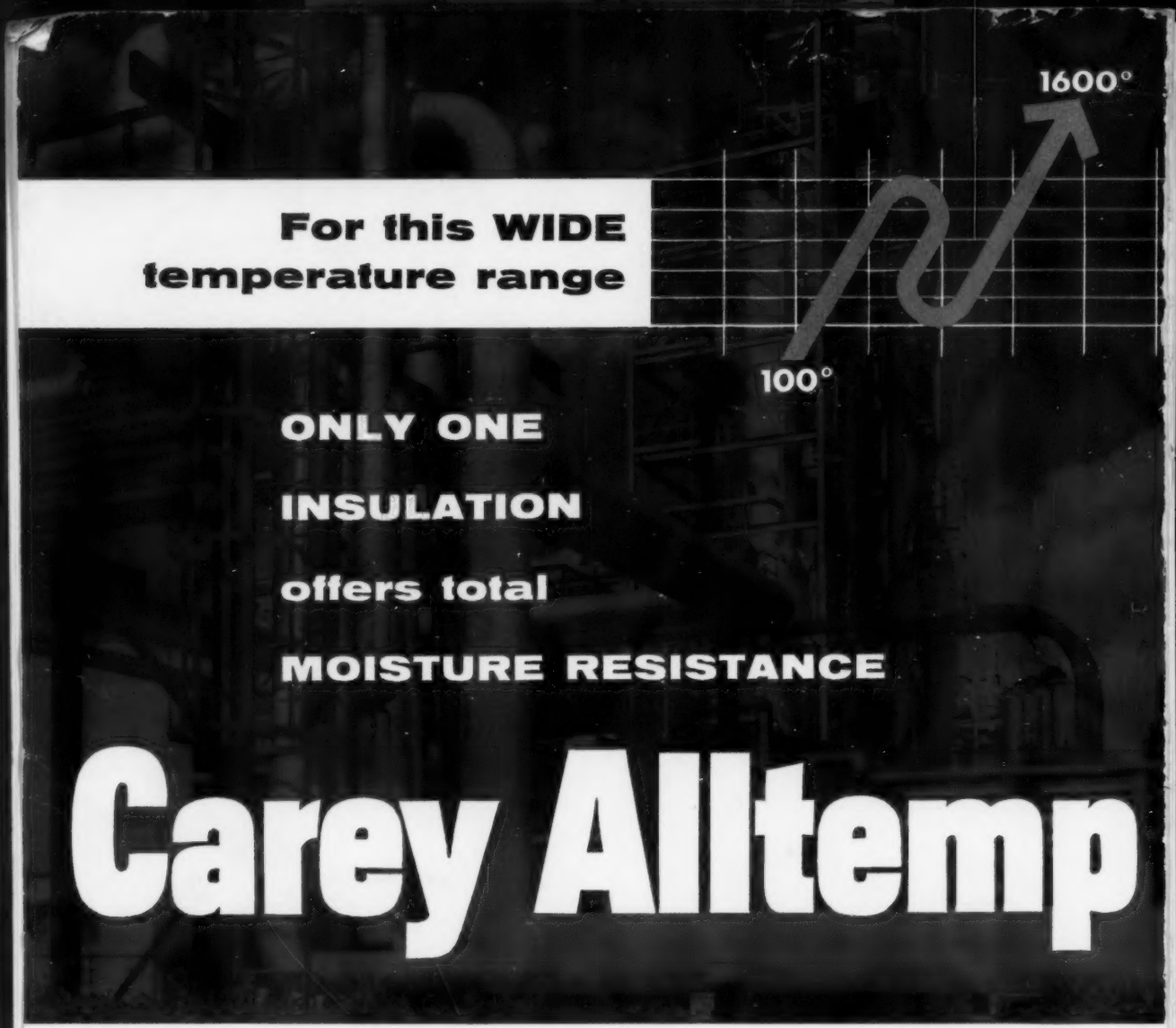

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